KING COUNTY CONVEYANCE SYSTEM IMPROVEMENT PROJECT

MILL CREEK/GREEN RIVER SUBREGIONAL PLANNING AREA

FINAL TASK 240 REPORT

JUNE 2001

HDR

In Association with

Herrera Environmental Consultants, Inc.

ACKNOWLEDGEMENTS

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INTRODUCTION

This task report discusses development of alternatives to provide sewer service to the Mill Creek/Green River Subregional Planning Area (MC/GR). This area includes all of King County's regional wastewater system service area South of Kent. It discusses the division of the MC/GR into planning zones and briefly reviews the existing King County Wastewater System. The methodology of County and local agency flow projections is summarized and compared. This report also discusses the system requirements based on the County flow projections and describes the proposed alternatives to meet those requirements. Capital components, construction factors, property and scheduling requirements are discussed for each alternative. A vicinity map, County facilities, and boundary of the MC/GR are shown in Figure 240-1.

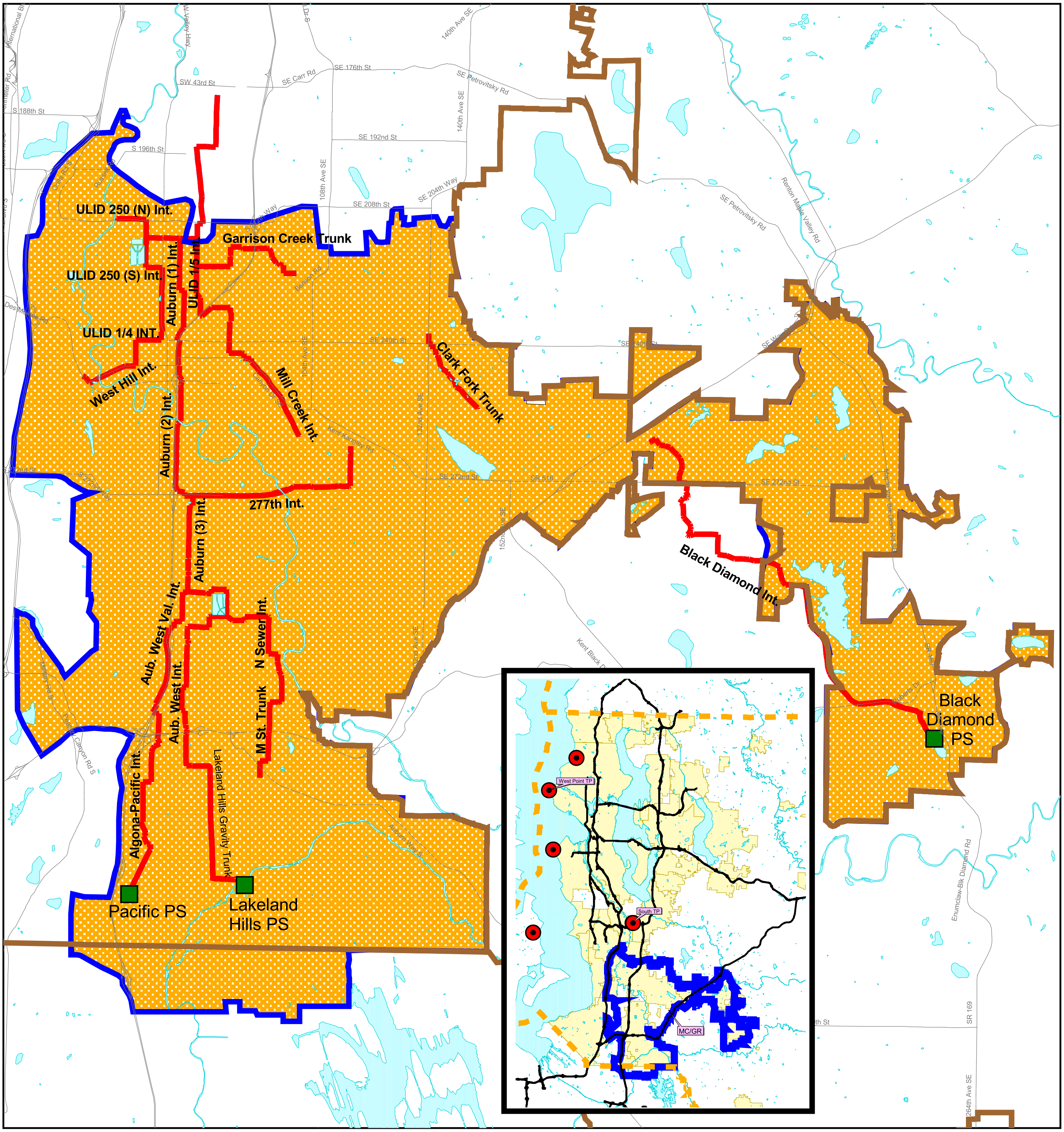

Figure 240 - 1: Mill Creek/ Green River Subregional Planning Area (MC/GR)

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KING COUNTY

0.5 0 0.5 1 1.5 2 2.5 Miles

N W E S

March 28, 2001

Legend

- 98 UGA Boundary
- MC/GR Boundary
- MC/GR King Co Pump Stations
- MC/GR Sewer
- MC/GR Planning Zone

MC/GR PLANNING ZONES

The MC/GR is divided into three planning zones. They are the Auburn Planning Zone, the Kent Planning Zone, and the Soos Planning Zone as shown in Figure 240-2. The three planning zones are convenient divisions of the MC/GR for managing the overall evaluation of conveyance system needs. The flow from each planning zone exits through one interceptor system, is primarily served by one local agency, and is independent of system changes in the other planning zones. The Auburn and Soos Planning Zones each flow to the Kent Planning Zone at the south end of the Auburn (2) Interceptor at about S. 277th Street. The planning zone boundaries were adjusted as analysis proceeded and alternatives developed which determined where flow projection areas (FPAs) were routed.

AUBURN PLANNING ZONE

The Auburn Planning Zone generally incorporates the area served by the City of Auburn and flows into the following King County interceptors and pump stations: Algona-Pacific Interceptor, Auburn (3) Interceptor, Auburn West Interceptor, Auburn West Valley Interceptor, M St Trunk, N Sewer Interceptor, Lakeland Hills Pump Station and Force Main, and Pacific Pump Station and Force Main.

KENT PLANNING ZONE

The Kent Planning Zone generally incorporates the area served by the City of Kent and flows into the following King County interceptors: 277th Interceptor, Auburn (1 & 2) Interceptors, Garrison Creek Interceptor, Kent Cross Valley Interceptor, Mill Creek Interceptor, ULID ¼ Kent Interceptor, ULID 1/5 Kent Interceptor, ULID 250 North and South Kent Interceptors, and West Hill Interceptor.

SOOS PLANNING ZONE

The Soos Planning Zone generally incorporates the area served by the Soos Creek Water and Sewer District within the Cities of Covington, Maple Valley, and Kent. Flow from this area is routed into the following King County interceptors and pump stations: Clark Fork Interceptor, 277th Interceptor, and Black Diamond Pump Station, Force Main, and Interceptor.

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EXISTING KING COUNTY WASTEWATER SYSTEM

KING COUNTY COMPREHENSIVE PLAN

The King County Comprehensive Plan defines the County's plan to serve the MC/GR. It consists of the 1958 Plan and subsequent amendments. The 1973 amendment and the designation of the Urban Growth Area (UGA) are the most significant changes to the 1958 Plan. The changes in the South King County are reflected in the existing County system in Auburn and Kent and the UGA boundary shown on the figures. Refer to Figures 210-5 and 210-7 in the Task 210 Report to compare the 1958 Plan with existing sewers and the Urban Growth Area.

KING COUNTY FACILITIES

The existing King County wastewater system in the MC/GR consists of ±163,270 feet of gravity sewers, ±11,840 feet of force main, and three pump stations. Table 240-1 quantifies the length and range of diameters and capacities of the County's existing gravity sewers within the MC/GR planning zones. The facilities are concentrated in the Kent and Auburn planning zones. In the Soos Creek WSD, the County has one gravity sewer, force main, and pump station facility that serves Black Diamond and only one short gravity trunk to serve the District. Refer to the Task 210 Report, Figure 210-1 to identify County interceptors and pump stations. The local sewer agencies collect flow from surrounding basins and route it to County sewers. Task 210 Report figures 210-9 through 210-12 show local sewer systems in relation to the County facilities. Note that GIS sewer information was not available for Black Diamond at the time of this study.

In the Auburn Planning Zone, the County has almost 75,000 linear feet of sewer which is about 74% of the 1958 Plan proposed sewers. Amendments to the 1958 Plan increased service area and proposed additional interceptors.

In the Kent Planning Zone, the County has almost 78,000 linear feet of sewer which is about 137% of the 1958 Plan proposed sewers. Amendments to the 1958 Plan proposed additional interceptors which are now in service.

In the Soos Planning Zone, the Soos Creek WSD development has been independent of the King County Comprehensive Plan. The 1958 Plan service sewers were routed south along Big Soos Creek and the Green River and are now outside the Urban Growth Area. As development occurred in the Soos Creek area, the local agency developed a system of pump stations to carry wastewater by the shortest route to a County facility. This resulted in a conveyance corridor and major pump stations along S 256th Street. Flow from surrounding areas are routed to this corridor by gravity or force main as they develop. Pump stations are generally located on one of the original 1958 Plan interceptor alignments so that construction of the interceptors proposed in the 1958 Plan would eliminate the pump station. Only 8% of the 1958 Plan proposed sewers have been built in the Soos Planning Zone at the time of this study.

Figure 240-3 shows existing County gravity sewers color-coded by capacity based on average slope through the section. The 277th Interceptor (Mill Creek Relief Sewer) and the South Interceptor are currently in construction and considered in development of alternatives.

Table 240-1 Existing King County Gravity Sewers

Gravity Interceptors	Length (ft)	Diameter Range (inches)		Capacity Range* (mgd)	
		Min.	Max.	Min.	Max.
AUBURN PLANNING ZONE					
Algona-Pacific & Auburn West Valley	24,804	21	42	2.8	86.1
Auburn (3)	16,288	42	72	38.7	136.1
Auburn West	15,136	24	42	4.3	44.2
M Street Trunk & N Sewer	18,606	18	36	3.1	37.8
	74,834				
SOOS PLANNING ZONE					
Black Diamond	3,200	10	15	1.6	8.3
Clark Fork	10,651	9	11	2.4	4.7
	13,851				
KENT PLANNING ZONE					
Auburn (1) & (2)	18,908	18	72	51.0	184.3
Garrison & ULID 1/5	11,663	12	24	19.8	2.6
Kent Cross Valley	3,662	54	72	32.2	146.4
Mill Creek & ULID 1/5	21,709	18	42	7.6	46.2
ULID 250 North	3,941	15	36	0.0	40.7
West Hill, ULID 1/4, & ULID 250 South	17,902	24	36	2.2	70.0
	77,785				
MC/GR	166,470				

*Pipes with negative slope are ignored.

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MC/GR FLOW PROJECTION METHODOLOGY

This section discusses development of current County flow projection methodology for the MC/GR including flow projection areas, basins, population forecasting, flow components, and flow routing. It also reviews local agency flow projection methodology used by Auburn, Black Diamond, Kent, Pacific, and Soos Creek Water and Sewer District.

KING COUNTY FLOW PROJECTION METHODOLOGY

MC/GR FLOW PROJECTION AREAS

Flow Projection Areas (FPAs) were developed from comparison of County basins with local sewers, basins, and comprehensive plans. They generally divide the County basins into smaller areas and adjust the boundaries to reflect existing or proposed service in the area. There are some areas included that were not part of any County basin. The area annexed to Pacific has been added. There are also some areas added in the vicinity of Jenkins and Covington basins by expansion of the Urban Growth Area including the area around Lake Sawyer. The FPAs are an interim tool used to route flow through a variety of alternatives. When the best alternative is selected FPAs will be combined into larger basins that reflect the flow routing of the selected alternative. There are forty-three Flow Projection Areas in the MC/GR. Nineteen FPAs are in the Auburn Planning Zone, twelve in the Kent Planning Zone, and twelve in the Soos Planning Zone.

Table 240-2 lists the area of each FPA and correlates each one to the County basin most closely associated with it. Figure 240-4 compares FPAs and County basins.

POPULATION FORECASTING

The June 1996 Puget Sound Regional Council Population (PSRC) Forecasts by Traffic Analysis Zones (TAZ) were used to forecast population beyond 1996 for subsequent decades of years 2010, 2020, 2030, and 2050. It was assumed that population was evenly distributed over the FPA. It was assumed that all population within the Urban Growth Boundary will be sewered and all the FPA areas will be developed by 2020. FPA development and sewered area was determined using County GIS maps (1996 data) showing aerial photos overlaid by local and county sewer lines.

Land use and zoning are determined by each city for it's jurisdiction and by community planning documents for unincorporated King County. King County and local jurisdiction GIS data was used in the analysis. Available data included local and county sewer lines and facilities, aerial photos, sensitive areas, parks, land use, and boundaries of TAZ zones, drainage, flow projection areas, Urban Growth Area, and MC/GR.

Table 240-2 1999 Flow Projection Areas (FPAs)

Primary KC RWSP Basin	Flow Projection Area	Total GIS Area (acres)
AUBURN PLANNING ZONE		
ALGONA	al-x	1,118
AUB3	aub3-c	1,222
	aub3-nw	767
	aub3-s	567
FWAUB3	fwaub-w	460
	fwaub-x	532
FWNE	fwne-w	1,386
	fwne-x	701
LAKELAND HILLS	lh-pc	982
MSTTRK	mst-e	1,362
	mst-n	582
	mst-ne	591
	mst-s	3,310
PACIFIC	pac-a	1,115
SEGREEN	seg-x	727
SOUTHERN SOOS	sss-sw	468
WHITERIVER	wr-x	3,296
WINT	wi-x	1,944
none	pac-x	1,002
AUBURN TOTAL		22,132
KENT PLANNING ZONE		
250N	250n-x	1,662
250S	250s-x	1,008
AUB2	aub2-n	694
	aub2-s	1,804
GARRISON	gar-x	1,688
KENTXVAL	xval-s	109
	xval-x	302
MILL	mill-e	1,327
	mill-x	3,268
ULID/C5E	c5e-x	364
ULID4	ulid4-x	685
WHILL	whill-x	1,998
KENT TOTAL		14,909
SOOS PLANNING ZONE		
AUB3	aub3-ne	1,058
COVINGTON	ls-11s	3,867
JENKINS	jenk-r	325
	ls-11n	2,146
	ls-14	483
	ls-15	4,041
MILL	mill-q	104
SOOSMILL	scrk-x	3,990
	ssm-q	196
	sss-ne	76
	sss-x	1,220
none	lks-x	1,454
SOOS TOTAL		18,960
MC/GR TOTAL		56,001

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FLOW COMPONENTS

For Auburn and Soos Planning Zones, a calibrated runoff model was used to make a 49-year simulation based on the rainfall record from Sea-Tac airport from 1948 to1977. The model was used to generate flow hydrographs for each flow projection area and rank peak flow to generate frequency curves for peak flow. The 20, 10, and 5 year peak flow for each flow projection area was determined from the frequency curves. For the Kent Planning Zone, no flow data was available to calibrate the model so an I/I rate of 2,900 gpad in 1990 under 20 year storm conditions was assumed for all flow projection areas. Flows for 5 and 10 year storm conditions were estimated from Auburn and Soos Planning Zones.

Per capita flow was assumed to be 60 gpcd for residential, 35 gpcd for commercial, and 75 gpcd for industrial land use. Base flow for each decade was determined from population, forecasts sewered area, and per capital flow values.

The calculated 1996 base flow was subtracted from model calibrated peak flow for each recurrence interval to get the peak inflow and infiltration (I/I) component for 1996. Then peak I/I flow was projected assuming a 7% per decade increase from the 1996 level through 2030 due to sewer degradation.

FLOW ROUTING

Flows were accumulated arithmetically for each sewer alignment without consideration of attenuation. King County used a hydraulic model to estimate attenuation factors. The impact was evaluated and it was determined that application of these factors would not change the required pipe sizes. Therefore, flow routing calculations were not adjusted to reflect attenuation.

AUBURN FLOW PROJECTION METHODOLOGY

This summary of Auburn's flow projection methodology is from the Comprehensive Sewerage Plan for the Sewage Collection System, City of Auburn, Washington, 1979, which was the latest information available at the time of this evaluation.

POPULATION FORECASTING

The sewer comprehensive plan used the February 1978 Statistical Information Report by the City of Auburn Department of Planning and Community Development to forecast population. It provided a statistical summary of population, housing and economic figures with population projections through 1990. Population forecasts for the surrounding unincorporated areas were based on the proposed Soos Creek Plateau Communities Plan (1978), the Federal Way Community Plan (1975), and proposed revisions to that plan (1979).

Land use in the service area is designated by the Auburn Comprehensive Land Use Plan (1968), the Soos Creek Plateau Plan (1979), the Federal Way Revised Community Plan (1980), and the Muckleshoot Indian Reservation. Low density residential population was estimated at 3.05 persons per unit and 4 units per acre. High density residential population was estimated at 2 persons per unit and 25 units per acre.

FLOW COMPONENTS

Infiltration and inflow was assumed to be 1,100 gpad. Low density residential was assumed to be 12.2 persons per acre and high density residential was assumed to be 50 persons per acre. Usage was assumed to be 60 gpcd residential, 3,000 gpad commercial and light industrial, and 3,700 gpad heavy commercial. The peaking factor varies with the size of the area served and the land use in that area. They range from 4.0 for 100 acre to 1.9 for 10,000 acre residential areas, from 3.2 for 100 acre to 2.0 for 5,000 acre light industrial areas, from 2.5 for 100 acre to 1.7 for 5,000 acre heavy industrial, and 1.75 for all commercial parcels.

BLACK DIAMOND FLOW PROJECTION METHODOLOGY

This summary of Black Diamond's flow projection methodology is from the Enumclaw-Black Diamond Regional Sewerage Study, June, 1970 and excerpts from the June 1988 City of Black Diamond, Facility Plan for Wastewater Treatment System and October 1989 City of Black Diamond, Comprehensive Sewerage Plan, which were the latest sources of information at the time of this evaluation.

POPULATION FORECASTING

Population projections started with the 1987 Puget Sound Council of Governments Population and Employment Forecasts (PSCOG) estimate and forecast low medium, and high growth rates. The low growth rate was based on average annual growth from 1980 to 1987. The medium growth rate was calculated from PSCOG forecasts for Census Tract 316 but PSCOG forecasts ended at 2000 so the same growth rate was extended out to 2010. The high growth rate assumes that the city will grow at a faster rate than the rest of Census Tract 316. Population projections for 2030 estimate maximum population of 3-5 persons per acre in about 640 acres of the City and 1-3 persons per acre in about 360 acres. The area is estimated at one person per acre or less and three large companies have extensive holdings of undeveloped land.

FLOW COMPONENTS

For existing facilities, infiltration was assumed to be 1,200 gpad and inflow was assumed to be 2,000 gpad. For new sewers, 600 gpad infiltration and 500 gpad inflow was assumed. Usage was assumed to be 60 gpcd. The peaking factor was set at 1.75 for major areas, 1.5 for 2 or more areas, and 3.0 for areas less than 3,000 acres.

KENT POPULATION FLOW PROJECTION METHODOLOGY

Following is a summary of Kent's flow projection methodology from the December 1980 City of Kent Comprehensive Sewerage Plan, which was the latest information at the time of this evaluation.

POPULATION FORECASTING

Kent used Activity Allocation Model (AAM) projections developed by Puget Sound Council of Governments (PSCOG) in 1979. Assuming uniform growth in each AAM district, population was estimated at 75,500 in the year 2000. Saturation population was assumed to be about 130,000 people. Assumed development of rural land would be restricted and development in urban areas would be encouraged. Assumed that percent population served would be 90% by 2000. The service area population projection for 2000 was 73,546 people.

FLOW COMPONENTS

Infiltration and inflow was assumed to be 1,100 gpad. Population density was assumed to be 3.2 people per unit residential and 2.0 people per unit multi-family. Usage was assumed to be 60 gpcd residential, 2,000 gpad light industrial, 4,000 gpad heavy industrial, 3,000 gpad light commercial, and 7,000 gpad heavy commercial. The peaking factor varies with the size of the area served and the land use in that area. They range from 4.0 for 100 acre to 1.9 for 10,000 acre residential areas, from 3.2 for 100 acre to 2.0 for 5,000 acre light industrial areas, from 2.5 for 100 acre to 1.7 for 5,000 acre heavy industrial, and 1.75 for all commercial parcels.

PACIFIC POPULATION FLOW PROJECTION METHODOLOGY

Following is a summary of Pacific's flow projection methodology from the March 1991 City of Pacific Sanitary Sewer System Plan, which was the latest information at the time of this evalutation.

POPULATION FORECASTING

Population estimates were based in part on the Puget Sound Council of Governments Population and Employment Forecasts (PSCOG) estimate of 2.58 people per dwelling unit rounded up to 2.6. It was assumed that the average number of people per household would decrease to 2.39 in 2010. It was assumed that population would increase at an annual rate of 2.8% between 1995 and 2000 then at 2% between 2001 and 2010.

FLOW COMPONENTS

A HYDRA model was used and data was to be available separately on request. Separate diurnal curves were used for modeling residential and non-residential flows. The residential curve showed morning and afternoon peaks and incorporated the selected peaking factor. The non-residential flow curve for institutional, commercial and industrial areas showed a uniform contribution of flow during working hours. Efforts to obtain copies of the flow model were unsuccessful.

Infiltration and inflow was assumed to be included in the residential usage value used for the model. Additional calculations added additional I/I prorated throughout the system to bring flow volume up to match wet weather flow through Lift Station 2. Population density was assumed to be 2.6 persons per dwelling unit. Usage was assumed to be 100 gpcd residential, 10 gpcd public use, 23 gpad community and neighborhood business, and 10 gpad light industrial. A peaking factor of 2.5 was incorporated in the residential usage hydrograph.

SOOS CREEK WATER AND SEWER DISTRICT POPULATION FLOW PROJECTION METHODOLOGY

Following is a summary of Soos Creek Water and Sewer District's flow projection methodology developed from the 1996 Soos Creek Water & Sewer Plan, which was the latest information at the time of this evaluation.

POPULATION FORECASTING

Land use and zoning are determined by City of Renton, City of Kent, and the 1991 King County amendment to the Tahoma and Raven Heights Community Plan and Area Zoning. Maple Valley and Covington are newly incorporated cities within the District. King County, Renton, and Kent GIS data was used in the analysis.

Ultimate residential capacity was calculated using the maximum number of housing units per acre allowed under the existing zoning, after removing critical areas and their respective buffers, pipeline rights-of-way, and public purpose lands. The final residential capacity was converted to population using a household size of 3.0 per the 1994 King County Annual Growth Report. The King county Preliminary Draft Soos Creek Urban Reserve Zoning Report zoning capacity and population forecasts were used to determine residential capacity for parcels zoned Urban Reserve (2,973 acres). Residential development potential within mixed-use commercial designations and zones, market availability factor, or a cushion were not considered. Sensitive areas were subtracted from buildable acreage.

Forecasts for the years 2000, 2001, 2010, and 2015 used the Household Growth Ranges by Urban Subarea adopted by King County in 1994 and the updated 1995 Puget Sound Regional Council Population (PSRC) Forecasts by Forecast Analysis Zones (FAZ). Growth for the rural subarea was not used because Soos Creek WSD is limited to providing service only to the urban area by the 1994 King County Comprehensive Plan. The 1990 PSRC base population was used. The FAZ and District boundaries were overlayed to calculate the percentage of FAZ within the District and within the planning area. Then proportional FAZ forecasts were added to the base population. The calculated forecasts for the planning area were added to the District forecasted numbers in only the year the area might eventually be served.

Projections for the planning area based on 1995 PSRC data are generally a little higher than projections based on the 1994 King County Comprehensive Plan.

FLOW COMPONENTS

The existing sewerage facilities were evaluated for hydraulic capacity using a HYDRA computer model which routes individual area hydrographs and adds them together in time as appropriate. The current number and location of connections to the sewer system were established from Soos Creek WSD account information and system configuration. The number of buildout connections is based on zoning.

Separate curves were used to model daily flow from commercial and residential sites. The shape of each curve was based on observed flow measurements. Higher weekend flows with two distinct peaks morning and night were used for residential. Weekday curves with more or less constant flow during the day and none at night were used for commercial sites. Schools were ignored.

Flow monitoring in the 1990s indicated an average sanitary flow of 70 gallons per capita per day (gpcd) for residential. It also indicated that the District did not experience peaking factors as large as the DOE design criteria, therefore no peaking factor was used in the HYDRA model. Based on the same data, inflow and infiltration (I/I) was assumed to be 500 gallons per acre per day (gpad) for the South system. The North system I/I was assumed to be 500 gpad in 1996 and 1100 gpad for 2015 and buildout. Where actual I/I values have been measured or if an area is suspected of having larger I/I flows then other values may have been used.

Population density was assumed to be 3.0 persons per household. Usage was assumed to be 70 gpcd residential and 20 gpcd business (commercial/industrial). No peaking factor was used. The model used hydrographs for residential and business.

SUMMARY OF FLOW PROJECTION METHODOLOGY

There is a wide variation in flow projection assumptions made by the local agencies and the County. Table 240-3 compares the input parameters.

Table 240-3 Flow Projection Criteria Summary

Jurisdiction	Pop. Forecast Source	Wet weather peaking factor	I/I factor (gpad)	Unit flow factors
City of Algona	n/a	n/a	n/a	n/a
City of Auburn	Statistical Information Report by the City of Auburn (1978)	4.0-1.9 for 100 to 10,000 residential acres 3.2-2.0 for 100 to 5,000 light industrial acres 2.5-1.7 for 100 to 5,000 heavy industrial acres 1.75 for all commercial parcels	1,100	60 gpcd residential 3,000 gpad commercial/light industrial 3,700 gpad heavy commercial 2.0 person/dwelling unit low density residential 3.05 person/dwelling unit high density residential
City of Black Diamond (*1970 data, ** 1980 data)	PSCOG (1987)	1.75 for major sewerage areas* 1.5 for 2 or more major sewerage areas* 3.0 for less than 2,000 acres*	3,200 (existing)* 1,100 (future)*	60 gpad* 4 person/dwelling unit single-family** 18 person/dwelling unit multi-family** 1-4 person/dwelling unit rural residential**
City of Kent	PSCOG (1979)	4.0-1.9 for 100 to 10,000 residential acres 3.2-2.0 for 100 to 5,000 light industrial acres 2.5-1.7 for 100 to 5,000 heavy industrial acres 1.75 for all commercial parcels		60 gpcd residential 2,000 gpad light industrial 4,000 gpad heavy industrial 3,000 gpad light commercial 7,000 gpad heavy commercial 3.2 person/dwelling unit single-family 2.0 person/dwelling unit multi-family
City of Pacific	PSCOG (?)	2.5 in residential hydrograph	varies	100 gpcd residential 10 gpcd public use 23 gpad community and neighborhood business 10 gpad light industrial 2.6 person/dwelling unit
Soos Creek WSD	Household Growth Ranges by Urban Subarea (1994) & PSRC (updated 1995)	none	South: 500 North: 500 (1996) 1100 (2015)	70 gpcd residential 20 gpcd business (commercial/industrial) 3.0 person/dwelling unit single-family
King County	PSRC (1996)	none	calibrated to flow measurements; projection increased 7% per decade through 2030	60 gpcd residential 35 gpcd commercial 75 gpcd industrial density varies

CONVEYANCE SYSTEM REQUIREMENTS AND ALTERNATIVES

This section presents the County flow projections and discusses the impacts to the County system. There is a discussion of the basis of evaluation and design. It discusses the conveyance system requirements for each planning zone based on the flow projections. Alternatives are proposed to meet system requirements for each planning zone. Discussion of alternatives includes route description, capital components, construction factors, and property and schedule requirements. Technical Memo 250 will expand detail, compare and evaluate alternatives and estimate costs.

Many County interceptors in the MC/GR will exceed capacity by the year 2010. Figure 240-5 shows the impact of County flow projections. Sewers are color-coded to show the decade the pipe capacity is exceeded. Red indicates that the sewer is exceeded by 2010. Orange, yellow, and light green sewers are exceeded by 2020, 2030, and 2050, respectively. Dark green sewers are not exceeded during the study period. Blue sewers were excluded from this analysis. Tables to support these figures are provided in the appendix.

Table 240-4 summarizes the area and projected base flow and peak flow inflow and infiltration under the 5 and 20 year storms for the years 2020 and 2050 for each Flow Projection Area.

BASIS OF EVALUATION AND DESIGN

Three basic parameters were used as the basis for sizing conveyance facilities.

Conveyance facilities and alternatives must have capacity to carry 20 year storm flow projected to the year 2050. Flow projection method is discussed above.

Mechanical equipment is assumed to have a 20 year service life and is evaluated for phasing or life cycle cost impact.

Basic infrastructure, such as pipes, manholes, and concrete structures are expected to have a service life in excess of 60 years so they are evaluated and sized with respect to the 2050 flow projections.

There are some locations where storage may be appropriate to include in final facility design. Storage analysis has been deferred to the specific project pre-design studies.

AUBURN PLANNING ZONE

CONVEYANCE SYSTEM REQUIREMENTS

In the Auburn Planning Zone, the projected flow with a 20 year storm exceeds the capacity of most of the existing sewers by 2010. Others will be exceeded by 2020 or 2030. A few short sections of sewer are not exceeded within the study period. Figure 240-6 shows existing sewers color coded by decade exceeded.

The projected 2050, 20 year event flow under a leaving the Auburn Planning Zone through the Auburn (3) Interceptor is about 76 million gallons per day (mgd) but the average capacity of the interceptor at that section is only about 66 mgd. Flow routing tables in the appendix quantify the amount capacity is exceeded in each decade for all sewers in the planning zone.

CONVEYANCE ALTERNATIVES

Two alternatives for service to the basins in the vicinity of Auburn were developed for this planning effort. Alternative 1 proposes constructing parallel sewers of the size needed to carry the additional flow. Alternative 2 reroutes flow from specific areas to a new north-south interceptor thus bypassing existing facilities.

AUBURN ALTERNATIVE 1: PARALLEL GRAVITY TRUNKS

Figure 240-7 shows the Alternative 1 alignments parallel to the existing facilities. Alignment variations that could reduce local impacts or cost may be found and should be the focus of task 300 level studies if this alternative is preferred.

Description

Proposed gravity trunks would be constructed parallel to most of the existing County gravity trunks in the Auburn planning zone in alignments similar to the existing trunks. For purposes of this evaluation, it is assumed that the proposed trunks would carry all flow from areas south of the existing trunks and pick up additional flow along the route as appropriate to avoid reconnection of side sewers. It is also assumed that existing alignments would continue to be used. Further study may select different parallel alignments.

Capital Components

Capital components for this alternative include approximately 69,000 linear feet of 12 inch to 42 inch gravity sewer pipe.

Construction factors

The alignments parallel to the M Street Trunk and the N Sewer Interceptor would be primarily in public right-of-ways. There would be one stream crossing, one railroad crossing, and one SR 18 crossing. Disruption of traffic would be the major impact along this alignment.

The alignment parallel to the West Interceptor would be constructed parallel to a railroad right-of-way and a public trail. Construction in the trail alignment would impact trail users. There would be, two railroad crossings, and five public trail crossings.

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Table 240-4 Area, Base Flow, Peak I/I Flow, and Projected Peak Flow for 5 and 20 Year Storms by Flow Projection Area

			Year 2020								Year 2050							
			5 year storm				20 year storm				5 year storm				20 year storm			
Flow Projection Area	Total Area	Sewered Area	Basin base flow (mgd)	5 year peak I/I flow (gpad)*	5 year peak I/I flow (mgd)	Projected basin peak flow (mgd)	Basin base flow (mgd)	20 year peak I/I flow (gpad)*	20 year peak I/I flow (mgd)	Projected basin peak flow (mgd)	Basin base flow (mgd)	5 year peak I/I flow (gpad)*	5 year peak I/I flow (mgd)	Projected basin peak flow (mgd)	Basin base flow (mgd)	20 year peak I/I flow (gpad)*	20 year peak I/I flow (mgd)	Projected basin peak flow (mgd)
AUBURN PLANNING ZONE																		
al-x	1118	1118	0.594	2287	2.6	3.15	0.594	2798	3.1	3.72	0.641	2424	2.7	3.35	0.641	2965	3.3	3.96
aub3-c	1222	1222	0.545	2287	2.8	3.34	0.545	2798	3.4	3.96	0.725	2424	3.0	3.69	0.725	2965	3.6	4.35
aub3-nw	767	767	0.162	2287	1.8	1.92	0.162	2798	2.1	2.31	0.192	2424	1.9	2.05	0.192	2965	2.3	2.47
aub3-s	567	567	0.177	2287	1.3	1.47	0.177	2798	1.6	1.76	0.220	2424	1.4	1.59	0.220	2965	1.7	1.90
fwaub-w	460	460	0.122	2287	1.1	1.17	0.122	2798	1.3	1.41	0.137	2424	1.1	1.25	0.137	2965	1.4	1.50
fwaub-x	532	532	0.146	2287	1.2	1.36	0.146	2798	1.5	1.63	0.165	2424	1.3	1.45	0.165	2965	1.6	1.74
fwne-w	1386	1386	0.329	2287	3.2	3.50	0.329	2798	3.9	4.21	0.371	2424	3.4	3.73	0.371	2965	4.1	4.48
fwne-x	701	701	0.156	2287	1.6	1.76	0.156	2798	2.0	2.12	0.183	2424	1.7	1.88	0.183	2965	2.1	2.26
lh-pc	982	786	0.147	2907	2.3	2.43	0.147	3738	2.9	3.08	0.232	3081	2.4	2.65	0.232	3962	3.1	3.35
mst-e	1362	1362	0.409	2035	2.8	3.18	0.409	2619	3.6	3.98	0.519	2157	2.9	3.46	0.519	2776	3.8	4.30
mst-n	582	582	0.493	2035	1.2	1.68	0.493	2619	1.5	2.02	0.671	2157	1.3	1.93	0.671	2776	1.6	2.29
mst-ne	591	591	0.172	2035	1.2	1.37	0.172	2619	1.5	1.72	0.253	2157	1.3	1.53	0.253	2776	1.6	1.89
mst-s	3310	3310	1.961	2035	6.7	8.70	1.961	2619	8.7	10.63	2.522	2157	7.1	9.66	2.522	2776	9.2	11.71
pac-a	1115	1115	0.111	2287	2.5	2.66	0.111	2798	3.1	3.23	0.148	2424	2.7	2.85	0.148	2965	3.3	3.45
pac-x	1002	1002	0.453	2287	2.3	2.74	0.453	2798	2.8	3.26	0.595	2424	2.4	3.02	0.595	2965	3.0	3.57
seg-x	727	727	0.033	2035	1.5	1.51	0.033	2619	1.9	1.94	0.041	2157	1.6	1.61	0.041	2776	2.0	2.06
sss-sw	468	468	0.135	2035	1.0	1.09	0.135	2619	1.2	1.36	0.184	2157	1.0	1.19	0.184	2776	1.3	1.48
wi-x	1944	1944	0.983	4379	8.5	9.50	0.983	5654	11.0	11.97	0.979	4642	9.0	10.00	0.979	5992	11.6	12.63
wr-x	3296	1640	0.261	2882	4.7	4.99	0.261	3738	6.1	6.39	0.339	3055	5.0	5.35	0.339	3962	6.5	6.84
	22,132		7.39		50.1	57.52	7.39		63.3	70.70	9.12		53.1	62.26	9.12		67.1	76.22
KENT PLANNING ZONE																		
250n-x	1662	1662	0.485	3030	5.0	5.52	0.485	3526	5.9	6.35	0.524	3212	5.3	5.86	0.524	3737	6.2	6.74
250s-x	1008	1008	0.465	3030	3.1	3.52	0.465	3526	3.6	4.02	0.522	3212	3.2	3.76	0.522	3737	3.8	4.29
aub2-n	694	694	0.240	3030	2.1	2.34	0.240	3526	2.4	2.69	0.310	3212	2.2	2.54	0.310	3737	2.6	2.90
aub2-s	1804	1804	0.570	3030	5.5	6.04	0.570	3526	6.4	6.93	0.755	3212	5.8	6.55	0.755	3737	6.7	7.50
c5e-x	364	364	0.171	3030	1.1	1.27	0.171	3526	1.3	1.45	0.194	3212	1.2	1.36	0.194	3737	1.4	1.55

*7% per decade I/I increases for "degradation"

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Table 240-4 Area, Base Flow, Peak I/I Flow, and Projected Peak Flow for 5 and 20 Year Storms by Flow Projection Area (continued)

			Year 2020								Year 2050							
			5 year storm				20 year storm				5 year storm				20 year storm			
Flow Projection Area	Total Area	Sewered Area	Basin base flow (mgd)	5 year peak I/I flow (gpad)*	5 year peak I/I flow (mgd)	Projected basin peak flow (mgd)	Basin base flow (mgd)	20 year peak I/I flow (gpad)*	20 year peak I/I flow (mgd)	Projected basin peak flow (mgd)	Basin base flow (mgd)	5 year peak I/I flow (gpad)*	5 year peak I/I flow (mgd)	Projected basin peak flow (mgd)	Basin base flow (mgd)	20 year peak I/I flow (gpad)*	20 year peak I/I flow (mgd)	Projected basin peak flow (mgd)
KENT PLANNING ZONE																		
gar-x	1688	1688	1.260	3030	5.1	6.37	1.260	3526	6.0	7.21	1.598	3212	5.4	7.02	1.598	3737	6.3	7.91
mill-e	1327	1327	0.550	1737	2.3	2.86	0.550	2117	2.8	3.36	0.810	1841	2.4	3.25	0.810	2244	3.0	3.78
mill-x	3268	3268	1.853	3030	9.9	11.76	1.853	3526	11.5	13.38	2.519	3212	10.5	13.01	2.519	3737	12.2	14.73
ulid4-x	685	685	0.280	3030	2.1	2.36	0.280	3526	2.4	2.69	0.332	3212	2.2	2.53	0.332	3737	2.6	2.89
whill-x	1998	1998	0.575	3030	6.1	6.63	0.575	3526	7.0	7.62	0.734	3212	6.4	7.15	0.734	3737	7.5	8.20
xval-s	109	109	0.051	3030	0.3	0.38	0.051	3526	0.4	0.43	0.057	3212	0.4	0.41	0.057	3737	0.4	0.46
xval-x	302	302	0.147	3030	0.9	1.06	0.147	3526	1.1	1.21	0.160	3212	1.0	1.13	0.160	3737	1.1	1.29
	14,909		6.65		43.5	50.11	6.65		50.7	57.34	8.51		46.1	54.57	8.51		53.7	62.24
SOOS PLANNING ZONE																		
aub3-ne	1058	1058	0.288	1411	1.5	1.78	0.288	1796	1.9	2.19	0.418	1496	1.6	2.00	0.418	1903	2.0	2.43
jenk-r	325	325	0.070	1342	0.4	0.51	0.070	1636	0.5	0.61	0.100	1423	0.5	0.56	0.100	1734	0.6	0.66
lks-x	1454		0.191	1614	1.9	2.08	0.191	1999	2.3	2.53	0.228	1711	2.0	2.23	0.228	2119	2.5	2.70
ls-11n	2146	2146	0.600	908	2.0	2.55	0.600	1118	2.4	3.00	0.750	963	2.1	2.82	0.750	1185	2.5	3.29
ls-11s	3867	3000	0.130	1502	4.5	4.64	0.130	1610	4.8	4.96	0.150	1592	4.8	4.93	0.150	1706	5.1	5.27
ls-14	483	483	0.110	1287	0.6	0.73	0.110	1546	0.8	0.86	0.150	1364	0.7	0.81	0.150	1639	0.8	0.94
ls-15	4041	4041	0.531	2075	8.4	8.92	0.531	2087	8.4	8.97	0.633	2199	8.9	9.52	0.633	2212	8.9	9.57
mill-q	104	104	0.030	2173	0.2	0.26	0.030	2527	0.3	0.29	0.040	2303	0.2	0.28	0.040	2678	0.3	0.32
scrk-x	3990	3990	1.420	1173	4.7	6.10	1.420	1401	5.6	7.01	1.860	1243	5.0	6.82	1.860	1485	5.9	7.78
ssm-q	196	196	0.050	1596	0.3	0.36	0.050	1918	0.4	0.42	0.070	1692	0.3	0.40	0.070	2033	0.4	0.47
sss-ne	76	76	0.020	1398	0.1	0.12	0.020	1687	0.1	0.15	0.020	1481	0.1	0.14	0.020	1788	0.1	0.16
sss-x	1220	1220	0.349	1393	1.7	2.05	0.349	1772	2.2	2.51	0.504	1477	1.8	2.31	0.504	1879	2.3	2.80
	18,960		3.79		26.3	30.09	3.79		29.7	33.49	4.92		27.9	32.81	4.92		31.5	36.39
MC/GR	56001	51828	17.82		119.9	137.73	17.82		143.7	161.53	22.55		127.1	149.64	22.55		152.3	174.85

*7% per decade I/I increases for "degradation"

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The alignment parallel to the Lakeland Hills gravity main would replace the existing sewer. It would be constructed in Auburn public rights-of-wayof "C" Street and 15th Street SW. Disruption of traffic would be the major impact. There would be no stream crossings, one railroad crossing, and one SR 18 crossing.

The alignment parallel to the Algona-Pacific Interceptor would be constructed in Algona public right-of-ways. Disruption of traffic would be the major impact.

The alignment parallel to the Auburn West Valley Interceptor would be constructed primarily in Algona and Auburn public right-of-ways. About 7,500 feet of the alignment would be constructed between Mill Creek and SR 167. Construction may require special provisions to protect the stream. There would be one stream crossing, one SR 18 crossing, and two SR 167 crossings. Disruption of traffic would be a major impact in Auburn and a minor impact in Algona.

The alignment parallel to the Auburn (3) Interceptor would be constructed parallel to a railroad right-of-way and a public trail. Construction in the trail alignment would impact trail users. There would be two railroad crossings and, one public trail crossing.

Property requirements

Parallel alternatives would require construction permits from Auburn and Algona. Easements or permits from Washington State, railroads, and several private property owners are required.

Schedule requirements

A significant portion of the Auburn (3) Interceptor's capacity is expected to be exceeded by 2020. Since the decade of exceedance does not occur until 2020, there would be adequate time to implement I/I reductions. As a result, future construction of parallel inceptors to Auburn (3) could be eliminated altogether.

The Lakeland Hills gravity sewer has corrosion damage that requires immediate attention. The alignment of the damaged section is the same as a portion of this proposed alternative. No parallel pipe will be required.

Variations

Interties at various locations could be investigated further. No other parallel alignments were analyzed.

AUBURN ALTERNATIVE 2: REROUTING

Figure 240-8 shows the Alternative 2 alignments.

Description

This alternative diverts flow from the existing trunks to the extent that all but one short section remains adequate to serve their reduced service area through the planning period. The 26th Street Trunk would be constructed parallel to the east-west section at the north end of the N Sewer Interceptor on 26th Avenue NE to convey flow from east of the Green River. The Southwest Interceptor would be constructed along West Valley Highway from the Pacific Pump Station force main north to the Auburn boundary. The Stuck River Trunk would convey flow from the southern most manhole of the M Street Trunk to the Southwest Interceptor. The Lakeland Hills Replacement Trunk would convey flow from the Lakeland Hills force main to the new Stuck River Trunk.

Capital Components

Capital components for this alternative include approximately 56,000 linear feet of 18 inch to 54 inch gravity sewer pipe.

Construction factors

The portion of the alignment along West Valley Highway would be constructed in the public right-of-way. The east-west portion at the south end would be built along the 3rd Avenue South right-of-way in Algona. About 7,500 lineal feet of the alignment would be constructed parallel to Mill Creek with associated wetlands possible for about 5,000 lineal feet. The alignment should be able to avoid major impacts to the creek and wetland. There would be four stream crossings, no railroad crossings, one SR 18 crossing, and one SR 167 crossing. Disruption of traffic would be a minor impact in Algona.

The alignment to replace the Lakeland Hills gravity sewer in "C" Street would be constructed in the Auburn public right-of-way of “C” Street. Disruption of traffic would be a major impact. There would be no stream crossings, no railroad crossings, and no highway crossings.

The alignment to divert flow from the south end of the M Street Trunk and pick up flow from Lakeland Hills Pump Station would be constructed in the rights-of-way17th Street SE, Auburn Avenue, “C” Street, 15th Street SW, in the existing sewer easement parallel to the public trail and the railroad, and in the SR 18 and SR 167 right-of-ways. There would be one stream crossing, one multiple track railroad crossing, one single track railroad crossing, one public trail crossing, one SR 18 crossing, and one SR 167 crossing.

The short trunk parallel to the N Sewer Interceptor would be constructed in the Auburn public right-of-way of 26th Avenue NE. Disruption of traffic would be an impact. Tunneling under the airport would be required.

Property requirements

The southwest gravity trunks alternative would require construction permits from Auburn and Algona. Easements or permits from Washington State and railroads and permission to tunnel under the airport runway would be required.

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Schedule requirements

A significant portion of the Auburn (3) Interceptor's Capacity is expected to be exceeded by 2020. Since the decade of exceedance does not occur until 2020, there would be adequate time to implement I/I reductions thus possibly eliminating the need for paralleling the Auburn (3) Interceptor.

Construction of the section of the Southwest Interceptor paralleling the Auburn (3) Interceptor might be deferred until 2020. However a section of pipeline would be required to connect the Southwest Interceptor to the downstream portion of the Auburn (3) Interceptor. As a result, this option may not be viable.

The Lakeland Hills gravity sewer has corrosion damage that requires immediate attention. The alignment of the damaged section is the same as a portion of this proposed alternative. The County is currently designing a replacement pipe at elevations and diameter to coincide with this proposed alternative.

Variations

The alignment proposed in the West Valley Highway right-of-way was also evaluated within the SR 167 right-of-way. There may be significant wetland issues along SR 167 not shown by GIS maps and construction at overpasses could be difficult. There appears to be less impact along a West Valley Highway alignment

KENT PLANNING ZONE

CONVEYANCE SYSTEM REQUIREMENTS

In the Kent Planning Zone, the projected flow with a 20 year storm exceeds the capacity of most of the existing sewers by 2010. Others will be exceeded by 2020 or 2030. Part of the Mill Creek, ULID 250 North Kent, and Kent Cross Valley Interceptors, the 277th Interceptor, and few short sections of sewer are not exceeded within the study period. Figure 240-9 shows existing sewers color coded to show the decade capacity is exceeded.

The projected 2050, 20 year event flow leaving the Kent Planning Zone through the Auburn (3) Interceptor is about 124 million gallons per day (mgd). The average capacity of the Auburn Interceptor at that point is about 78 mgd

At the south end of the Kent Planning Zone, the flow from Auburn and Soos Planning Zones enters the Auburn Interceptor. Flow projections are about 36 mgd from Soos and about 76 mgd from Auburn. Flow routing tables in the appendix quantify the capacity exceeded by decade for all sewers in the planning zone.

CONVEYANCE ALTERNATIVES

Two alternatives for service to the basins in the vicinity of Kent were developed for this planning effort. Alternative 1 proposes constructing parallel sewers of the size needed to carry additional flow. Alternative 2 reroutes flow from specific areas to a new north-south interceptor thus bypassing existing facilities.

KENT ALTERNATIVE 1: PARALLEL GRAVITY TRUNKS

Figure 240-10 shows the Alternative 1 alignment parallel to the existing facilities. Alignment variations that would reduce local impacts or cost may be found and should be the focus of Task 300 level studies if this alternative is preferred.

Description

Proposed gravity trunks would be constructed parallel to almost all of the existing County gravity trunks in the Kent Planning Zone in approximately the same alignments as the existing trunks. Exceptions are the ULID 250 North Kent Interceptor and the Mill Creek Interceptor south of W James Street. The existing Auburn (1 & 2) Interceptors is located in the public rights-of-way of SR 167, S 228th Street, and 70th Avenue S. It also goes through approximately 2,600 lineal feet of easements through private property parallel to 72nd Avenue S and approximately 3,000 lineal feet of railroad or public trail right-of-way. The land use designations are mixed use and manufacturing for the area north of the Green River and agricultural for the area south of it. For purposes of this evaluation, it is assumed that the proposed trunks would carry all flow from areas south of the existing trunks and pick up additional flow from interties with existing pipe.

The alignment parallel to the West Hill, the ULID ¼ Kent, and ULID 250 South Kent Interceptors would be constructed parallel to the existing sewers. The existing sewers are in the public right-of-way of Reith Road, Meeker Street, 64th Avenue South, W James Street, 67th Place S, West Valley Highway (SR 181), and S 216th Street. The land use designations are mixed use, low and medium density multifamily, mobile home park, industrial, community facility, and open space for the area east of the Green River. They are agricultural and medium density multifamily for the area south of it.

The alignment parallel to the Mill Creek Interceptor north of W James Street would be constructed parallel to the existing sewers. The existing sewers are in easements north of W James Street then in the rights-of-way of SR 167, 4th Avenue N, and 76th Avenue S. Land use designations are single family residential (SF-6), medium density multifamily, and mixed use east of SR 167 and manufacturing west of it.

The alignment parallel to the Garrison Creek Relief and the ULID 1/5 Kent Interceptor would be constructed parallel to the existing sewers. The existing sewers are constructed in easements and the public rights-of-way of S 218th Street, 84th Avenue S, and S 222nd Street. Most of the easements are between S 224th Street and S 218th Street and are adjacent to Garrison Creek for about half that distance. Additional easements are between 76th Avenue S and the west end of S 222nd Street. Land use designations are single family residential (SF-3 and SF-6) east of SR 167 and commercial, industrial, and manufacturing west of it.

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Capital Components

Capital components for the parallel alternative include approximately 53,600 linear feet of 12 inch to 60 inch gravity sewer pipe.

Construction factors

The alignment parallel to the Auburn (1 & 2) Interceptors would be in the same rights-of-ways above but the section through the easement would be moved to 72nd Avenue S. Construction would be in railroad or public trail easements for approximately 3,000 linear feet. There would be one Green River crossing, one stream crossing, no railroad crossings, no public trail crossings, and one SR 167 crossing. GIS coverages indicate a stream crossing(s) but could not be located or verified from aerial photos. Verification of stream crossings in addition to evaluation of requirements associated with stream crossings should be performed in later studies.

The alignment parallel to the West Hill, the ULID ¼ Kent, and ULID 250 South Kent Interceptors would be constructed in the same rights-of-ways the existing pipes. There would be one Green River crossing. Congestion is primarily in the area between Meeker Street and the West Valley Highway. Disruption of traffic would be a major impact in that area.

The alignment parallel to the Mill Creek Interceptor north of W James Street would be in the same rights-of-way and easements as the existing pipes. The alignment in easements is about 4,300 linear feet. The GIS map shows a stream parallel to the sewer for about 2,700 linear feet in the easement north of James Street. but aerial photos show no sign of a natural channel. There would be three stream crossings one railroad crossing, and one SR 167 crossing. Construction through approximately 4,300 linear feet of easements could be a major impact on property owners and add significant time and expense to the project. Traffic would be disrupted during construction north of SR 167 in the manufacturing area.

The alignment parallel to the Garrison Creek Relief and ULID 1/5 Kent Interceptor is in the creek bed of Garrison Creek for about 1,400 linear feet and 400-500 linear feet are in a known slide area. These are major construction obstacles. There would be two stream crossings, one railroad crossing, and one SR 167 crossing. GIS coverages indicate a stream crossing(s) but could not be located or verified from aerial photos. Verification of stream crossings in addition to evaluation of requirements associated with stream crossings should be performed in later studies. Traffic would be disrupted during construction west of SR 167 in the commercial, industrial, and manufacturing areas.

Property requirements

The parallel alternative would require construction permits from Kent. Alignments in existing easements on private property and along railroads or public trails would require new temporary construction easements and permanent easements may require renegotiation.

Schedule requirements

Sewers that will exceed capacity by 2010 require alternatives in place by that time.

Variations

Interties at various locations could be investigated further. No other parallel alignments were analyzed.

KENT ALTERNATIVE 2: REROUTING

Figure 240-11 shows the Alternative 2 alignments and service area from which flow is routed past existing facilities. This alternative proposes a one long, large diameter gravity interceptor and two smaller short interties that reroute flow from upstream portions of other trunks. The rerouting strategy ensures that the downstream sections of existing trunks remain adequate to serve their reduced basins through the planning period.

Description

The Southwest Interceptor would be constructed along West Valley Highway (SR 181) from the north boundary of Auburn to the South Interceptor currently under construction. It would include interties to the Auburn (1 & 2) Interceptors.

The "James Trunk" would be constructed along James Street to divert flow from the Mill Creek Interceptor to the existing Auburn (1) Interceptor. Land use designations are single family residential (SF-8), community facility, and mixed use north of James and city center south of it.

The "Meeker Trunk" would be constructed along Meeker Street to divert flow from the West Hill Interceptor to the proposed trunk parallel to the Auburn (1) Interceptor. The parallel line would be routed along the West Valley Highway. Land use designations are medium density multifamily and mixed use.

Portions of Garrison Creek Relief Trunk require parallel sewers. Some sections of the garrison Trunk are located in sensitive areas. Level 300 studies should evaluate alternatives to construction of parallel sewers along the existing alignment.

Capital Components

Capital components for this alternative include approximately 35,200 linear feet of 15 inch to 72 inch gravity sewer pipe.

Construction factors

The Southwest Interceptor parallel to West Valley Highway would be constructed in public right-of-way. There would be one Green River crossing, four stream crossings, no railroad crossings, no public trail crossings, and one SR 516 (Des Moines Road) crossing. GIS coverages indicate a stream crossing(s) but could not be located or verified from aerial photos. Verification of stream crossings in addition to evaluation of requirements associated with stream crossings should be performed in later studies. Traffic would be disrupted during construction north of the Green River in the mixed use and manufacturing area.

The "Meeker Trunk" alignment to divert flow from the south end of the West Hill Interceptor would be constructed in the right-of-way of Meeker Street. There would be no special crossings. Disruption of traffic would be a temporary impact.

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The "James Trunk" alignment to divert flow from the Mill Creek Interceptor would be constructed in the right-of-way of James Street. There would be two railroad crossings, and one public trail crossing. Disruption of traffic would be a temporary impact. Traffic would be disrupted during construction with the greatest impact to the city center land use area.

Property requirements

The rerouting alternative would require construction permits from Kent. Permits from Washington State and railroads would be required.

Schedule requirements

Sewers with capacity exceeded by 2010 require alternatives in place by that time.

Variations

Many possible routes were investigated but not selected for analysis including SR 167 right-of-way for the Southwest Interceptor. A final route should be developed in the Task 300 level analysis.

SOOS PLANNING ZONE

CONVEYANCE SYSTEM REQUIREMENTS

In the Soos Planning Zone, the projected flow with a 20 year storm exceeds the capacity of the existing Black Diamond Interceptor by 2010. The Clark Fork trunk is not exceeded within the study period. Figure 240-12 shows existing sewers color coded by decade exceeded.

The 2050 projected flow with a 20 year storm discharged from the Soos Planning Zone through the 277th Interceptor to the Auburn (1) Interceptor is about 40 million gallons per day (mgd). The capacity of the 277th Interceptor is adequate to carry the flow.

The 2050 projected flow with a 20 year storm from the Black Diamond service area is about 5.3 million gallons per day (mgd) but the capacity of County facilities is about 1.6 mgd. Flow routing tables in the appendix quantify the capacity exceeded by decade for all sewers in the planning zone.

There is potential for additional trunks upstream of regional pump stations for areas that meet the criteria for County service. County service criteria is an area of at least 1,000 acres with adequate financial resources to support construction of the interceptor.

CONVEYANCE ALTERNATIVES

Four alternatives for service to the flow projection areas within the Soos Planning Zone were developed for this planning effort. Alternative 1 approximates most closely what Soos Creek WSD has planned to serve the area. Alternatives 2-4 started from the premise that King County might choose to collect and pump flow from along alignments of the 1958 planned sewers, especially where they exit the Urban Growth Area.

For purposes of this evaluation, it was recognized that any alternative that did not convey along stream corridors as proposed in the 1958 plan required flow to be converged at several key locations or "sites". From these sites, flow would generally be pumped through alternative corridors except where pumping could be eliminated by gravity sewers.

Figure 240-13 shows the 1958 Plan sewer lines and identifies conveyance sites A through H relevant to the alternatives for this planning zone. The sites are described as follows:

Site A is the 277th Interceptor anywhere east of the Green River and is common to all alternatives.

Site B is the site identified by the Mill Creek Relief Sewer Planning Study to serve Southern Soos basin and is located on the UGA boundary.

Site C is in the vicinity of Soos Creek WSD Lift Station 10 at the downstream end of the County's Clark Fork Trunk. Capacity of the existing Lift Station 10 is approximately 4,500 gpm (6.5 mgd).

Site D' is located along SR 18 near the UGA boundary along the route of one of the 1958 Plan service sewers.

Site D' is outside the UGA boundary along the route of one of the 1958 Plan service sewers. Site D' appears to be a logical point to construct one pump station instead of two (sites D and E), but site D' was not considered feasible since it is outside the Urban Growth Area. Site D is situated a little northeast of the UGA boundary to sit at the lowest elevation in the area.

Site E is in the vicinity of Soos Creek WSD Lift Station 11 near the UGA boundary along the route of one of the 1958 Plan service sewers. Capacity of the existing Lift Station 11 is approximately 2,600 gpm (3.7 mgd).

Site E' is on the UGA boundary along the route of one of the 1958 Plan service sewers. It is excluded from the consideration due to its location outside the UGA. Site E was selected for planning purposes rather than site E' since all flow upstream from site E could be routed to Site D by gravity sewers constructed along SR 18. Under this plan one large pump station could be eliminated and only a small area flowing to site E south of SR 18 would be left to be served by a local pump station.

Note:
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Site F is in the vicinity of Soos Creek WSD Lift Station 15B on the UGA boundary along the route of one of the 1958 Plan service sewers. Capacity of the existing Lift Station 15B is approximately 4,000 gpm (5.8 mgd).

Site G is at the County's Black Diamond Pump Station.

Site H is near the low point of the longest siphon in Black Diamond gravity sewer.

King County GIS topographic (20 foot contours) and aerial photo data was used to approximate force main and gravity line requirements and to evaluate alignments. GIS land use, zoning, sensitive area, water body, and parks coverages were used to evaluate impacts of each alternative.

Pipelines would be constructed primarily along existing road rights-of-way where it is possible to reduce environmental disruption and mitigation requirements.

Table 240-7 summarizes the percent of the planning area routed to regional facilities by gravity and the percent routed by local pump stations as described for each alternative below. The local agency planning is described in the Task 220 Report.

Table 240-5 Extent of County Gravity Service by Alternative

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
	Area	Area	Area	Area
GRAVITY TO REGIONAL FACILITY	60%	69%	69%	69%
LOCAL LIFT STATION	40%	31%	31%	31%

*Based on 1999 King County projected basin peak flow for the year 2050 with 20 year storm.

SOOS ALTERNATIVE 1: 256TH CORRIDOR ROUTE

Figure 240-14 shows the Alternative 1 alignments, pump stations, and area served by local pump stations and gravity systems. This alternative generally accommodates the plan being implemented by Soos Creek WSD. Gravity sewers and five regional pump stations with associated forcemains would be constructed under this alternative. Regional facilities would serve the same basins as Soos Creek WSD Lift Stations 10 at site C, 11 at site E, and 15B at site F. Forcemains would parallel existing Soos Creek WSD force main routes in public right-of-ways. Capacity of existing local forcemains would be utilized.

By area of the Soos Planning Zone, approximately 60% would flow by gravity to regional facilities. Approximately 40% would be pumped to regional facilities by local lift stations. Black Diamond (±18%) would continue to be pumped north through existing regional facilities.

Description

SITE B: A regional pump station would be constructed along SR 18 west of Soosette Creek at site B to pump approximately 3.2 mgd to site A. It would operate with about 160 feet of static head and a total dynamic head of about 175 feet and require 11,600 linear feet of force main and 6,900 linear feet of gravity sewer. The force main would be routed southwest on

SR 18, then west on SE 304th Street, then north on 124th Avenue SE, west on SE 288th Street, north on 118th Avenue SE to SE 277th Street, west on the extension of SE 277th Street along the north side of Pine Tree School and Pine Tree Park, and north on 114th Avenue SE to intercept the 277th Interceptor.

<u>SITE C</u>: A regional facility would be constructed in the vicinity of Soos Creek WSD Lift Station 10 at site C at the south end of the Clark Fork Trunk to pump approximately 31 mgd to site A. It would operate with about 130 feet of static head and a total dynamic head of about 170 feet and require approximately 6,800 linear feet of force main and approximately 6,500 linear feet of gravity sewer to convey flow to the 277th Interceptor. The force main would be constructed parallel to the existing Soos Creek WSD force mains in SE 256th Street and 116th Avenue SE. A portion of the flow would be routed through the existing Soos Creek WSD force mains.

<u>SITE D</u>: Flow would be conveyed to regional facilities by local pump stations.

<u>SITE E</u>: A regional pump station would be constructed in the vicinity of Soos Creek WSD Lift Station 11 at site E to pump approximately 8.6 mgd to site C. It would have about 110 feet of static head and total dynamic head of about 160 feet and require approximately 15,100 linear feet of force main. The existing site is not suitable for expansion. The force main would be constructed primarily in SE 256th Street. Other streets affected would be determined after site selection. A portion of the flow would be routed through the existing Soos Creek WSD force mains.

<u>SITE F</u>: A regional pump station would be constructed in the vicinity of Soos Creek WSD Lift Station 15B at site F to pump approximately 12.3 mgd to site C. It would have about 30 feet of static head, and total dynamic head of about 160 feet, and require approximately 26,300 linear feet of force main. The force main would be constructed primarily in SE 240th Street, SR 18, SE 244th Street, SE Wax Road, 180th Avenue SE, and SE 256th Street. A portion of the flow would be routed through the existing Soos Creek WSD force main.

<u>SITE G</u>: The Black Diamond Pump Station is adequate as designed to serve the southeast portion of Black Diamond. If flow exceeds the capacity of the Rock Creek siphon, excess flow would be routed to a new pump station at site H.

<u>SITE H</u>: A regional pump station would be constructed at site H to pump approximately 5.3 mgd from the existing pump station and the rest of the area within the UGA around Black Diamond to site E. It would operate with about 175 feet of static head and total dynamic head of about 190 feet and require approximately 1,000 linear feet of force main and approximately 32,800 linear feet of gravity sewer. The force main would be constructed parallel to the existing siphon. The gravity sewer would be constructed approximately parallel to the existing sewer. A portion of the flow would be routed through the existing Soos Creek WSD force mains.

Capital Components

Capital components for Alternative 1 include five pump stations, approximately 60,800 linear feet of force main, and approximately 46,200 linear feet of gravity main. Approximately 55,000 LF of local force main and gravity sewer would be regionalized.

Note:
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Construction factors

SITE B: The force main from a regional pump station along SR 18 west of Soosette Creek at site B would be constructed primarily in the public right-of-way on SR 18, SE 304th Street, 124th Avenue SE, SE 288th Street, 118th Avenue SE, and 114th Avenue SE. The portion of the alignment in easements is in public property. The force main would be parallel to existing Auburn force and gravity mains in SE 304th Street. The alignment would not cross any streams. The alignment in the 124th Avenue SE right-of-way parallels about 200 linear feet of wetland. Mitigation may be required. Disruption of traffic during construction would be a major impact.

SITE C: The force main from a regional pump station at site C to the 277th Interceptor would be constructed primarily in the public right-of-way of SE 256th Street, 116th Avenue SE, and SE 264th Street. It would be parallel to the existing Soos Creek WSD forcemains from Lift Stations 10 and 11. The alignment would cross two streams in the SE 256th Street right-of-way. It would cross one stream in the 116th Avenue SE right-of-way and run parallel to it for about 1,000 linear feet. Disruption of traffic during construction would be a major impact.

SITE E: The force main between regional facilities site E and site C would be constructed primarily in the public right-of-way of SE 256th Street. Impact to additional streets depends on what site is selected. It would be parallel to the existing Soos Creek WSD force main between Lift Stations 10 and 11 in SE 256th Street. The alignment would cross two streams in the SE 256th Street right-of-way and one in SE 262nd Place. The alignment in the SE 256th Street right-of-way goes through about 550 linear feet of wetland adjacent to one of the streams. Mitigation may be required. Disruption of traffic during construction would be a major impact.

SITE F: The force main between regional facilities site F and site C would be constructed primarily in the public right-of-way of SE 240th Street, SR 18, SE 244th Street, SE Wax Road, 180th Avenue SE, and SE 256th Street. It would be parallel to the existing Soos Creek WSD force main between Lift Stations 10 and 15B. The alignment would cross two streams in the SE 256th Street right-of-way, one in 180th Avenue SE, one in SE 244th Street, and one in SE 240th Street. The alignment in the SE 256th Street right-of-way goes through about 550 linear feet of wetland adjacent to one of the streams. Mitigation may be required. Disruption of traffic during construction would be a major impact.

SITE H: The proposed pump station would be near a creek. The force and gravity sewers would parallel existing pipe through several easements and a railroad crossing.

Property requirements

Alternative 1 would require construction permits from Auburn, Black Diamond, Kent, Maple Valley, and Covington for gravity and force mains. Property must be purchased for all five pump stations. Soos Creek WSD has proposed a site for a regional pump station at site C near their existing Lift Station 10 site. Easements would be required to cross the school and park properties.

Schedule requirements

All existing and currently proposed Soos Creek WSD conveyance facilities will be exceeded by 2010 using County flow projections.

Variations

Proposed routes are restricted to public rights-of-way except in a few short sections. Additional study may result in shorter routes using easements.

SOOS ALTERNATIVE 2: SR 18 SOUTH ROUTE

Figure 240-15 shows the Alternative 2 alignments, pump stations, and area served by local pump stations and gravity systems. Gravity sewers and four regional pump stations with associated forcemains would be constructed under this alternative. Soos Creek WSD Lift Station 10 at site C and the associated force main would become regional facilities. Soos Creek WSD Lift Station 11 at site E would be eliminated and flow routed southwest by gravity along SR 18. Capacity of the existing local force main from Lift Station 15B at site F would be utilized.

By area of the Soos Planning Zone, approximately 69% would flow by gravity to regional facilities. Approximately 31% would be pumped to regional facilities by local lift stations.

Description

<u>SITE B</u>: A regional pump station would be constructed along SR 18 west of Soosette Creek at site B to pump approximately 3.2 mgd to site A. It would operate with about 160 feet of static head and total dynamic head of about 190 feet and require 11,600 linear feet of force main and 6,900 linear feet of gravity sewer. The sewers would follow the same route as Alternative 1.

<u>SITE C</u>: Existing Soos Creek WSD Lift Station 10 and force main would be adequate to serve the projected flow.

<u>SITE D</u>: A regional pump station would be constructed at site D to pump approximately 26 mgd southwest to the top of the hill. The force main would be constructed along SR 18 from the vicinity of Soos Creek to 152nd Avenue SE. Gravity sewer would be constructed to carry flow from there to a location west of Soosette Creek and SR 18 at site B. All pipelines would be constructed along SR 18. It would have about 90 feet of static head, total dynamic head of about 110 feet, 4,300 linear feet of force main, and 6,300 linear feet of gravity sewer.

<u>SITE E</u>: Flow would be routed to site D by gravity. Approximately ±200 linear feet of gravity sewer would be constructed in SE 262nd Place between 180th Avenue SE and Soos Creek WSD Lift Station 11 at site E to eliminate that existing local lift station. Approximately 10,000 linear feet of gravity sewer would be constructed along SR 18.

<u>SITE F</u>: A regional pump station would be constructed in the vicinity of Soos Creek WSD Lift Station 15B at site F to convey approximately 12.3 mgd to site D. It would have about 80 feet of static head, total dynamic head of about 170 feet, approximately 7,500 linear feet of force main, and approximately 11,000 linear feet of gravity main. The gravity and force main would be

Note:
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constructed west on SE 240th Street, southwest on SR 18, west on SE 244th Street, southwest on SE Wax Road, south on 180th Avenue SE, and southwest on SR 18.

SITE G: Same as Soos Alternative 1.

SITE H: Same as Soos Alternative 1.

Capital Components

Capital components for Alternative 2 include four pump stations, approximately 31,200 linear feet of force main, and approximately 73,500 linear feet of gravity main. Existing Lift Station 10 and approximately 21,000 LF of local forcemain and gravity sewer would be regionalized

Construction factors

SITE B: Same as Soos Alternative 1.

SITE C: No construction required.

SITE D: The gravity and force main from a regional pump station along SR 18 between 152nd Avenue SE and Soos Creek at site D would be constructed in the public right-of-way of SR 18. The pipeline would cross two streams. Disruption of traffic during construction would be a major impact.

SITE E: See site F.

SITE F: The force main from a pump station at site F to site D and collecting flow from site E would be constructed primarily in the public right-of-way of SE 240th Street, SR 18, SE 244th Street, SE Wax Road, and 180th Avenue SE. One stream crosses under each of the following roads of the alignment: SR 18, 180th Avenue SE, SE 244th Street, and SE 240th Street. The alignment along SR 18 crosses about 700 linear feet of wetland adjacent to the road and one of the streams. Mitigation may be required. Disruption of traffic during construction would be a major impact.

SITE H: Same as Soos Alternative 1.

Property requirements

Alternative 2 would require construction permits from Auburn, Black Diamond, Kent, Maple Valley, and Covington for gravity and force mains. Property must be purchased for four pump stations. Soos Creek WSD Lift Stations 10 would become a regional facility. Easements would be required to cross the school and park properties. Permits would be required from Washington State.

Schedule requirements

All Soos Creek conveyance will be exceeded by 2010 under County flow projections.

Variations

Proposed routes are restricted to public rights-of-way except in a few short sections. Additional study may result in shorter routes using easements.

SOOS ALTERNATIVE 3: SR 18 COMBINED ROUTE

Figure 240-16 shows the Alternative 3 alignments, pump stations, and area served by local pump stations and gravity systems. Gravity sewers and four regional pump stations with associated forcemains would be constructed under this alternative. Soos Creek WSD Lift Station 10 at site C and the associated force main would become regional facilities. Soos Creek WSD Lift Station 11 at site E would be eliminated and flow routed southwest by gravity along SR 18. Capacity of the existing local force main from Lift Station 15B at site F would be utilized.

By area of the Soos Planning Zone, approximately 69% would flow by gravity to regional facilities. Approximately 31% would be pumped to regional facilities by local lift stations.

Description

SITE B: A regional pump station would be constructed along SR 18 west of Soosette Creek at site B to convey approximately 2.6 mgd to site D. It would have about 150 feet of static head, total dynamic head of about 165 feet, 6,300 linear feet of force main, and 4,300 linear feet of gravity main. The force main would be routed northeasterly along SR 18 to about 152nd Avenue SE then gravity sewer would carry the flow to site D.

SITE C: Same as Soos Alternative 2.

SITE D: A regional pump station would be constructed along SR 18 between 152nd Avenue SE and Soos Creek at site D to convey approximately 23.8 mgd to site A. It would have about 120 feet of static head, total dynamic head of about 175 feet, 19,000 linear feet of force main, and 6,700 linear feet of gravity main. The force main would carry flow southwest on SR 18, west on SE 288th Street, north on 132nd Avenue SE, west on SE 282nd Street, north on 118th Avenue SE to SE 277th Street, west on the extension of SE 277th Street along the north side of Pine Tree School and Pine Tree Park, and north on 114th Avenue SE to intercept the 277th Interceptor.

SITE E: Same as Soos Alternative 2.

SITE F: Same as Soos Alternative 2.

SITE G: Same as Soos Alternative 1.

SITE H: Same as Soos Alternative 1.

Capital Components

Capital components for Alternative 3 include four pump stations, approximately 40,600 linear feet of force main, and approximately 71,300 linear feet of gravity main. Existing Lift Station 10 and approximately 21,000 LF of local forcemain and gravity sewer would be regionalized.

Note:
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Construction factors

SITE B: The gravity and force main from a regional pump station at site B to site D would be constructed in the public right-of-way of SR 18. The pipeline would cross two streams. Disruption of traffic during construction would be a major impact.

SITE D: The gravity and force mains between regional pumps station site D and site C would be constructed primarily in the public right-of-way of SR 18, 132nd Avenue SE, 118th Avenue SE, SE 288th Street, 114th Avenue SE, SE 282nd Street, and in easements along the north side of Pine Tree School and Pine Tree Park.

SITE E: See site F.

SITE F: Same as Soos Alternative 2.

SITE H: Same as Soos Alternative 1.

Property requirements

Alternative 3 would require construction permits from Auburn, Black Diamond, Kent, Maple Valley, and Covington for gravity and force mains. Property must be purchased for four pump stations. Soos Creek WSD Lift Stations 10 would become a regional facility. Easements would be required to cross the school and park properties. Permits would be required from Washington State.

Schedule requirements

All Soos Creek conveyance will be exceeded by 2010 under County flow projections.

Variations

Proposed routes are restricted to public rights-of-way except in a few short sections. Additional study may result in shorter routes using easements. It may be possible to pump from site B directly to the forcemain from site D to site A instead of pumping from site B to site D.

SOOS ALTERNATIVE 4: SR 18 CENTER ROUTE

Figure 240-17 shows the Alternative 4 alignments, pump stations, and area served by local pump stations and gravity systems. Gravity sewers and four regional pump stations with associated forcemains would be constructed under this alternative. Soos Creek WSD Lift Station 10 at site C and the associated force main would become regional facilities. Soos Creek WSD Lift Station 11 at site E would be eliminated and flow routed southwest by gravity along SR18.

By area of the Soos Planning Zone, approximately 69% would flow by gravity to regional facilities. Approximately 31% would be pumped to regional facilities by local lift stations.

Description

SITE B: Same as Alternative 1.

SITE C: Same as Alternative 2.

SITE D: Same as Soos Alternative 3 except F flow rate is approximately 25 mgd.

SITE E: Same as Soos Alternative 2.

SITE F: Same as Soos Alternative 2.

SITE G: Same as Soos Alternative 1.

SITE H: Same as Soos Alternative 1.

Capital Components

Capital components for Alternative 4 include four pump stations, approximately 46,000 linear feet of force main, and approximately 74,000 linear feet of gravity main. Existing Lift Station 10 and approximately 21,000 LF of local force main and gravity sewer would be regionalized.

Construction factors

SITE B: Same as Soos Alternative 1.

SITE C: Same as Soos Alternative 2.

SITE D: Same as Soos Alternative 3.

SITE F: Same as Soos Alternative 2.

SITE H: Same as Soos Alternative 1.

Property requirements

Alternative 4 would require construction permits from Auburn, Black Diamond, Kent, Maple Valley, and Covington for gravity and force mains. Property must be purchased for four pump stations. Soos Creek WSD Lift Stations 10 would become a regional facility. Easements would be required to cross the school and park properties. Permits would be required from Washington State.

Schedule requirements

All Soos Creek conveyance will be exceeded by 2010 under County flow projections.

Variations

Proposed routes are restricted to public rights-of-way except in a few short sections. Additional study may result in shorter routes using easements.

MISCELLANEOUS ALTERNATIVES

Many possible routes were investigated but not selected for analysis. These routes may warrant further study during pre-design. The following briefly summarizes some of those routes and the reasons they were not considered in depth.

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Tunnel from site B or site D to site A: Sites B and D are lower than the 277th Interceptor (site A). There is no advantage to using a tunnel.

Tunnel from site D to site B: The tunnel would eliminate a pump station at site D but it would be about 7,300 feet long.

Force main and gravity sewers site D to site C: It would be possible to route flow from site D to site C and then repump that flow from site C. Routing flow to site B or directly to site A, there were less property requirements and fewer capital components.

APPENDIX 240-A

ATTENUATION FACTORS

Linda Allen

From: Ji, Zhong [Zhong.Ji@METROKC.GOV]
Sent: Tuesday, November 16, 1999 9:09 AM
To: 'Linda Allen'
Subject: RE: CSI PLAN - Attenuation calculations

Sorry, it is a mistake when I read the number from my map here.
It should be:
> RE*AUBURN3 .R18H-66 0.936
> RE*AUBURN1 .R18H-21A 0.912
>
> ----------
> From: Linda Allen[SMTP:lallen@herrerainc.com]
> Sent: Tuesday, November 16, 1999 8:11 AM
> To: 'Ji, Zhong'
> Subject: RE: CSI PLAN - Attenuation calculations
>
> RE*AUBURN3 .R18H-66 0.936
> RE*AUBURN3 .R18H-66 0.912
>
> Is one of these from the east and one from the west?
>
> ______________________________________
> Linda Allen
>
> Herrera Environmental Consultants, Inc.
> 2200 Sixth Avenue, Suite 601
> Seattle, WA 98121
> Voicemail (206) 441-4908 x147
> Fax (206) 441-9108
> Phone: (206) 441-9080
>
>
> -----Original Message-----
> From: Ji, Zhong [mailto:Zhong.Ji@METROKC.GOV]
> Sent: Monday, November 15, 1999 3:36 PM
> To: 'Linda Allen'
> Cc: Peterson, Bob
> Subject: RE: CSI PLAN - Attenuation calculations
>
>
> Hi, Linda,
>
> I have finished a model simulation using a 20 year storm under 2050

base
> flow and I/I conditions. I'd like to send you the result of the peak
> attenuation before I can do a brief summary report of the model run
some
> time later. The peak attenuation in the following table is defined as
> the
> ratio between the model simulated peak flow and the sum of the peak
> flows
> upstream of the location.
>
> Peak attenuation at selected locations based on the 20 year storm:
>

Location	Peak Attenuation
> RE*WINTSEWR.GR27-01	0.983
> RE*MSTTRUNK.GR22-2A	0.954
> RE*AUBURN3 .R18H-66	0.936
> RE*WVAL.R79-1	0.945
> SWTRUNK. 8	0.999
> Downstream end of STUCK TRUNK	0.982
> RE**AUBURN2.R18H-26 in SWTRUNK	0.940
> RE*AUBURN3 .R18H-66	0.912
> RE*ULID 1/5.53	0.972
> RE*KENTX.R18G-3	0.865
> RE*ULID 1/2.49	0.847

>
> In addition to the attenuations, I have also some findings about James
> Trunk. The current Mill Creek Trunk seems to have almost enough
capacity
> to
> deal with this storm. But on the other hand, Garrision need more room
> for
> the storm. We can discuss this later.
>
> Please let me know if anything is unclear. Thanks,
>
> Zhong
>
> DNR, Wastewater Treatment Division
> King County
> (206)684-1726
> zhong.ji@metrokc.gov
>

APPENDIX 240-B

KENT PLANNING ZONE FLOW PROJECTIONS

Kent basin flow projections

Prepared by Zhong Ji, 5/10/2001 Draft

Given information

- GIS sewer basin boundaries
  The following map shows the study area, including the sewer basin boundaries based on the local sewer lines. The information is available for us at the time of this work.

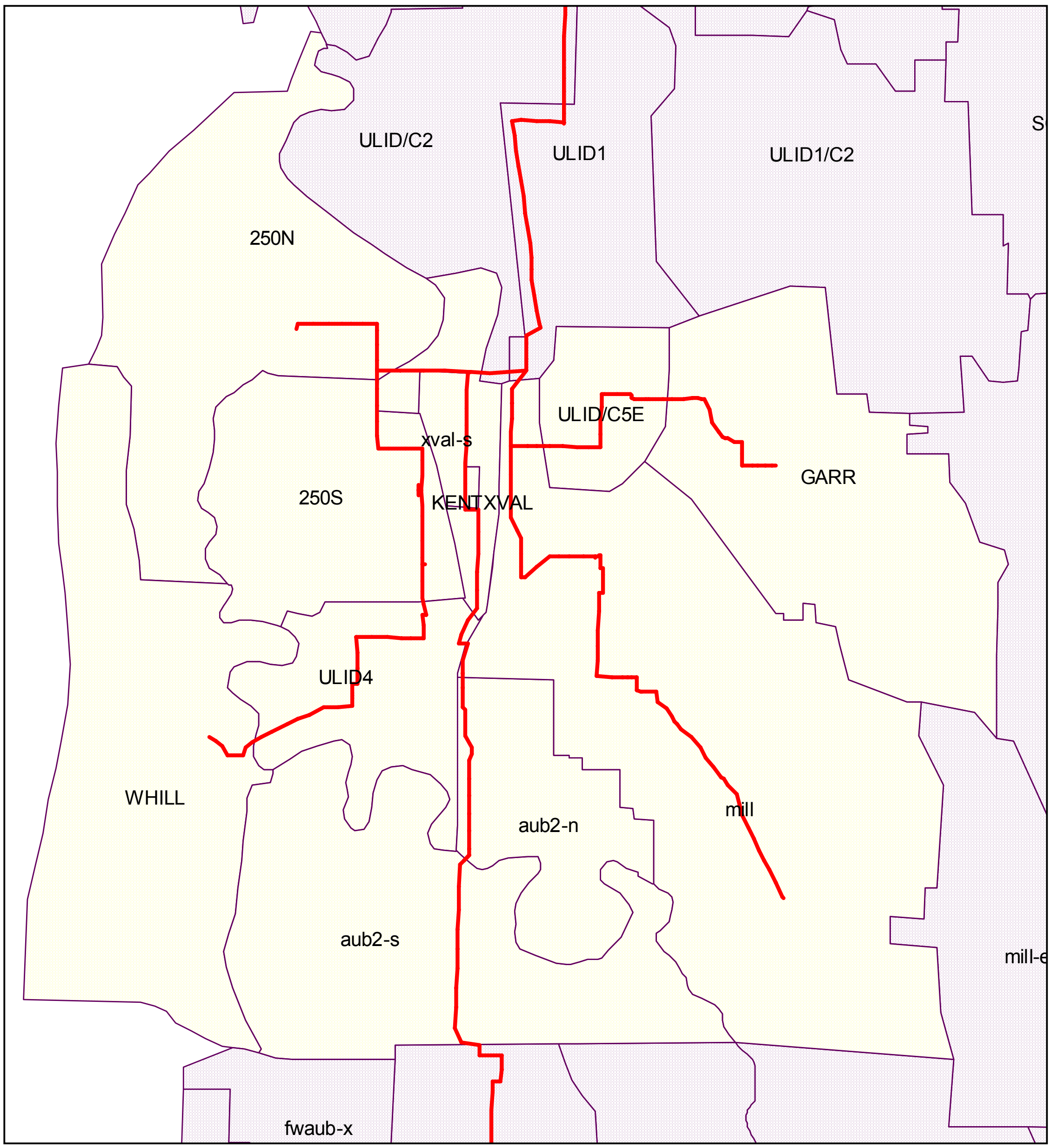

Figure 1 Sewer Basins, King County Interceptor Locations

- Flow data

  Since we have no flow data from this area, there is no model calibration and simulation involved in the flow projection. Assumption has been made for now and the flow projections are subject to any future model calibrations.

- Orthogonal Air photo

  Orthogonal air photo taken from this area in 1996 is available through King County Arc/View GIS. When overlapped with local sewer lines, it gives good information about the portion of basin area sewered, developed and undeveloped. The estimation of sewered, unsewered, and undeveloped area was done based on the orthogonal photo and used for the Runoff model simulation.

- Rainfall information

  The Sea-Tac rainfall record (49 years from 1948 to 1997) is available for any future model calibration and long term simulation.

Base flow and Inflow/Infiltration Projection

The basin flow projection is based on the following procedure:

A value of 2900 gpad I/I is assumed for all the basins in this area for 1990 under 20 year storm conditions. Peak I/I is projected assuming the peak I/I flow from the area will increase 7% per decade from the 1990 level till 2030 as a result of sewer line degradation. The recurrence curves used to determine flows with 10-year and 5-year recurrence for each basin are based on the information from the Auburn and Lower Green basins.

Based on TAZ population data, the basin base flow are estimated according to the following flow factors:

Population component	Residential	Commercial	Industrial
Flow per capita (gpd)	60	35	75

1996 base flow (gallon per acre per day) is determined according to the population using above table and the sewered area in each basin. The basin development and local sewer information is determined according to the orthogonal air photo and the sewer map from local agency whenever available, assuming population is evenly distributed in the basin.

Subtract 1996 base flow from the peak flow (20, 10, and 5 year peak) to get I/I peak flow for 1996 conditions

Base flows for 2000 through 2050 are determined based on TAZ population projection with an assumption that all the unsewered population will be sewered and all the basin area will be developed in 2020.

The total basin peak flow projections are summarized in the following tables.

Summary of basin peak flow projections for Kent area (flow in mgd)
Basins include: aub2-s, aub2-n, c5e, garr, mill ulid4, whill, xval-s, kxv, 250n, and 250s

	20 Year	10 Year	5 Year
1996	29.5	27.8	25.8
2000	33.3	31.3	28.1
2010	43.1	40.4	34.3
2020	54.0	50.6	41.2
2030	57.4	53.8	43.8
2040	57.9	54.3	44.3
2050	58.5	54.9	44.8

APPENDIX 240-C

AUBURN PLANNING ZONE FLOW PROJECTIONS

Lower Green River and Mill Creek basin flow projections

Prepared by Zhong Ji, July 22, 1999 Draft

Given information

- GIS sewer basin boundaries
  The following map shows the study area, including the sewer basin boundaries based on the local sewer lines. The information is available for us at the time of this work.

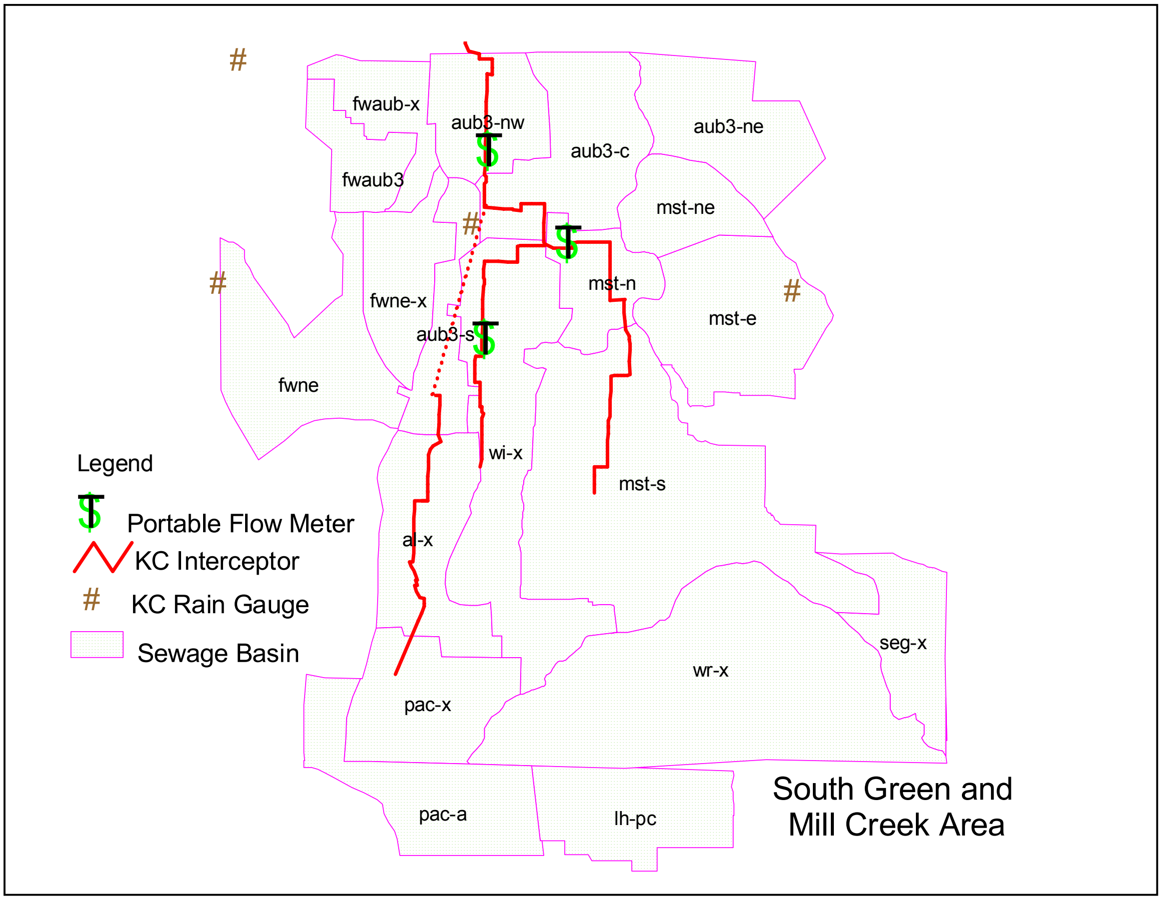

Figure 1 Sewer Basins, King County Interceptors, Flow Meter and Rain Gauge Locations

- Flow data

  Limited flow data were collected from this area with King County WTD portable flow monitoring system. There is a flow monitoring station located at MH GR22-2A of the M Street Trunk. It covers flow from six sewer basins (Basins seg-x, mst-s, mst-e, mst-n, sss-sw, and mst-ne). Another portable flow meter is located downstream of the West Interceptor Sewer at MH GR27-9. The meter measures flow from Lakeland Hill and White River basins in Auburn (Basins lh-pc, wr-x, and wi-x) area. The third portable flow meter is located downstream of the two meters in Auburn Interceptor at manhole R18H-53. The meter measures flow from Pacific, Algona, some Auburn sewer basins, and north east of Federal Way basins (Basins pac-a, pac-x, al-x, aub-3s, fwne, fwne-x, fwaub3, fwaub-x, aub3-nw, and aub3-c) in addition to the two upstream portable metered flows. The portable meters were installed to collect flow and level data several years ago. The portable metered flows are used in this study to calibrate the Runoff model for the basins. The meter locations are shown in Figure 1.

- Orthogonal Air photo

  Orthogonal air photo taken from this area in 1996 is available through King County Arc/View GIS. When overlapped with local sewer lines, it gives good information about the portion of basin area sewered, developed and undeveloped. The estimation of sewered, unsewered, and undeveloped area was done based on the orthogonal photo and used for the Runoff model simulation. Due to lack of local sewer information for the Pacific and North East Federal Way area, the sewered area from the WW2020 King County sewer basins is assumed.

- Rainfall information

  A number of King County WLRD rainfall gauges are available for this area as shown in Figure 1. The rainfall data were used for model calibration. Due to limited recording period from these gauge stations, Sea-Tac rainfall record (49 years from 1948 to 1997) was used for long term simulation to get statistics of the basin I/I flow estimates.

Model setup

The RUNOFF model was set up according to the basin boundaries defined in Figure 1. There are 19 sewer basins in our Runoff Model simulation for flow projections in this area. The basin parameters are based on the basin conditions such as basin geometric data, basin conditions, and basin dry weather and wet weather flow conditions subject to model calibration and comparison with measured flow.

Model calibration and Verification

Preliminary model calibration was done based on the data collected from King County WTD portable flow monitoring stations. The data collected from these meters seem to be problematic. Major data quality problems were found in the data from portable meter in M Street Trunk at MH GR22-2A and in Auburn Interceptor at MH R18-H53 as will be briefly discussed. Calibration is mainly based on major storm event during November of 1998. The storm event has a recurrence period of about 1 to 2 years.

Storm #1 Nov. 15, 1998 to Dec. 3, 1998

Flow and level data from the flow meter upstream of M Street Trunk during the period during Nov. 15 – Dec. 3, 1998 were used to calibrate the Runoff Model for M Street Trunk service area, West Interceptor Sewer service area, and Auburn Interceptor service area. Rainfall event during the same period was compared with the Runoff Model output. Figure 2 - 4 shows the comparison.

Comparison between rainfall event and flow measurement shows good response for all three meters during this storm. This set of flow data is used for analyzing flow data for other events. The storm during this period is used as the base of the Runoff Model calibration.

According to the flow measurement before the rainfall event, flows in West Interceptor and M Street Trunk composed approximately two thirds of the flow in Auburn Interceptor with almost equal amount of flow from West Interceptor and M Street Trunk.

Peak flows in West Interceptor and M Street Trunk composed about half of the peak flow in Auburn Interceptor. The flow data from Auburn Interceptor shows a failure of the portable meter for a period after Dec. 3, 1998.

Runoff Model parameters for the sewerage basins were adjusted based on the flow measurement during this storm event. Several other storms were selected for comparison between the calibrated model to validate the flow data and model results.

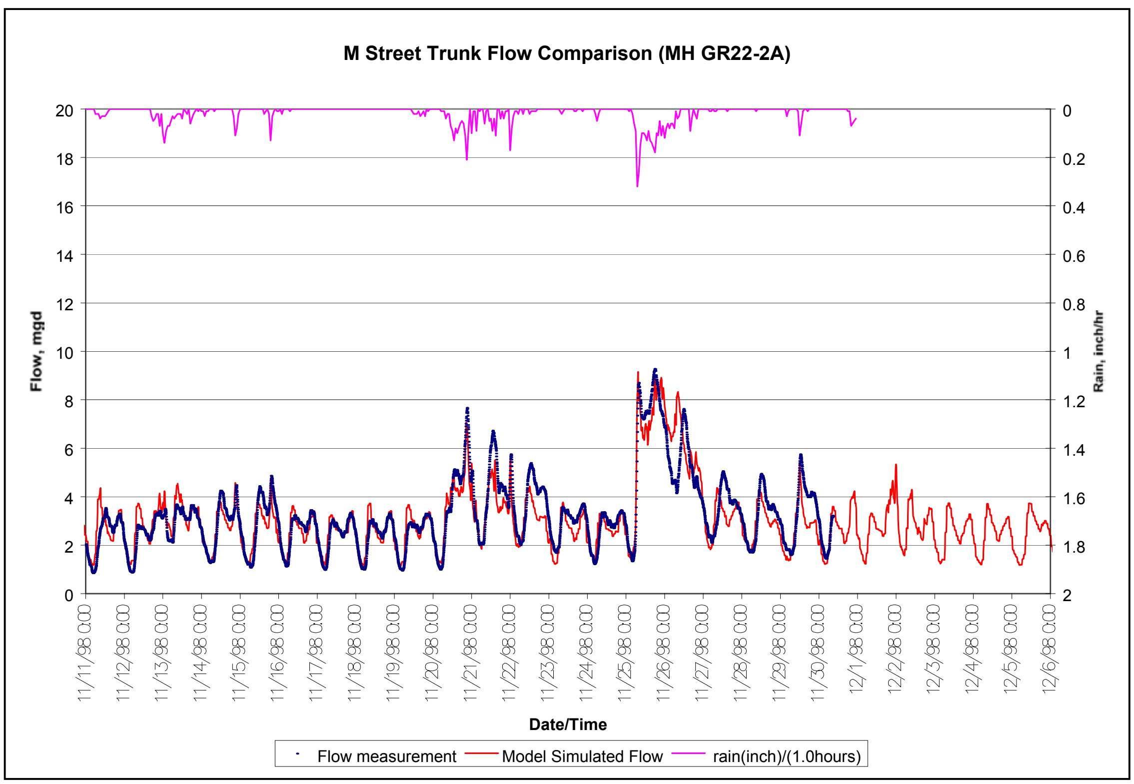

Figure 2

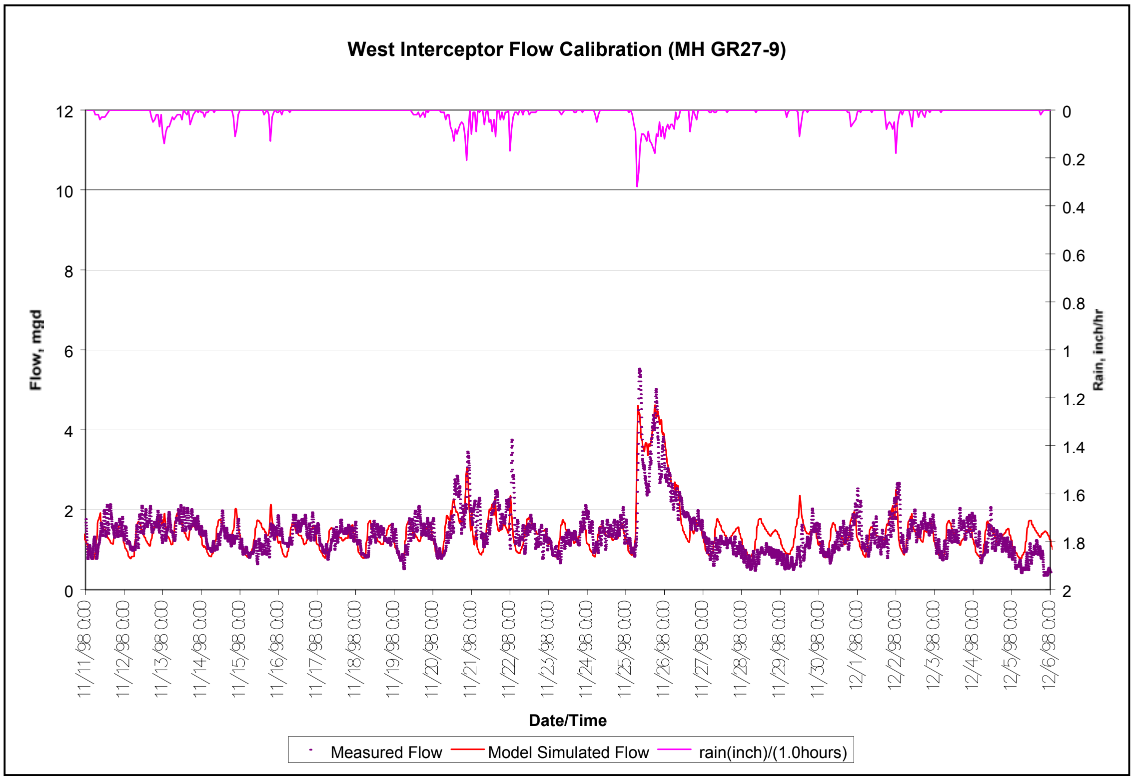

Figure 3

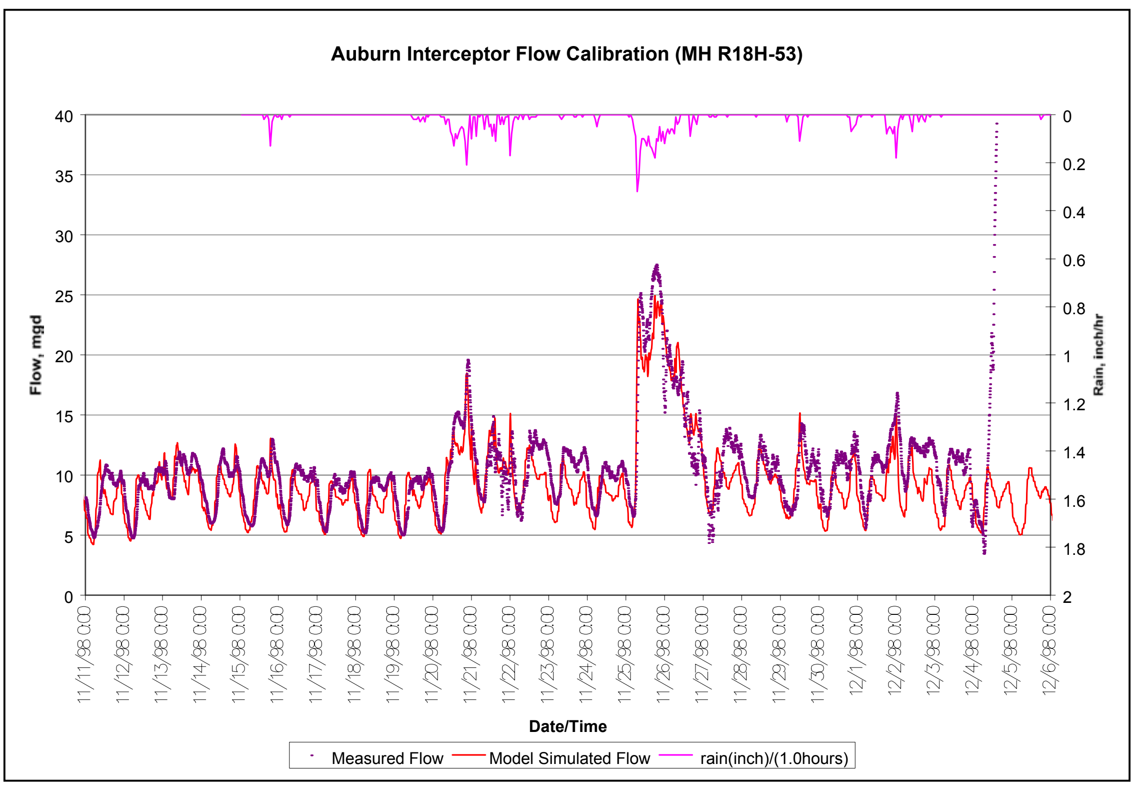

Figure 4

Storm #2 Dec. 20, 1996 – Jan. 10, 1997

Flow data from the flow meters at M Street Trunk, West Interceptor, and Auburn Interceptor during period of Dec. 20, 1996 to Jan. 10, 1997 were used to validate the flow data and model simulated results. Rain and snow events during the same period were compared with the flow results. Figure 5 - 7 shows the comparison.

The flow meter in West Interceptor shows a consistent response with the rainfall data as well as the model result (Figure 6). Due to the snow fall before the rainfall event, there seems to be more flow collected during the intense rainfall event. The diurnal peak flows before and after the intensive rainfall event is about 2 mgd that is in line with the flow data during November 1998 (Figure 3).

The flow data from M Street Trunk appears to have problems intermittently during this period. As is shown in Figure 5, the flow measurement is drifting up and down before the intensive rainfall. The meter flow approaching zero on Dec. 21 and Dec. 22 that is below the base flow when there is no rainfall event. The metered flow drifted near zero again on Dec. 26 and Dec. 29 before the big storm event.

The flow data from Auburn Interceptor was having problems during this period as is seen in Figure 6. The meter flow was drifting lower with certain response to the rainfall event. The sum of the flows from M Street Trunk and West Interceptor is even higher than the flow measurement from this location indicating that the flow collected from this meter is not reliable.

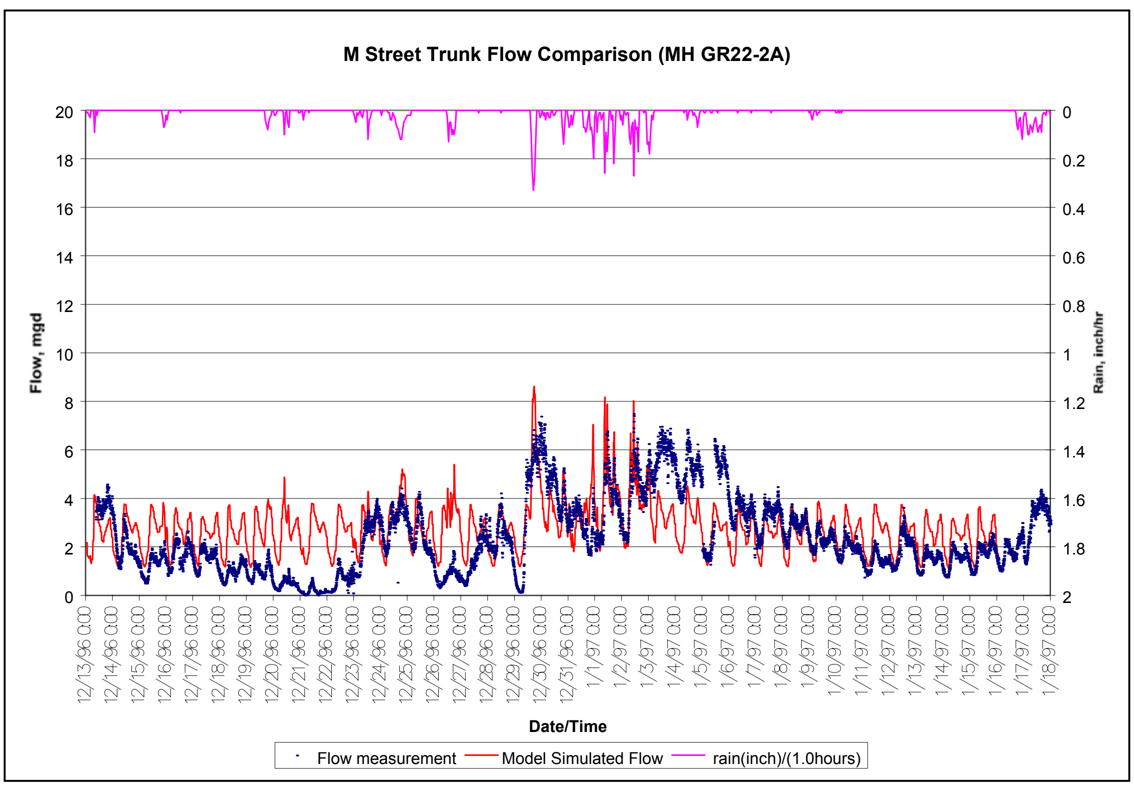

Figure 5

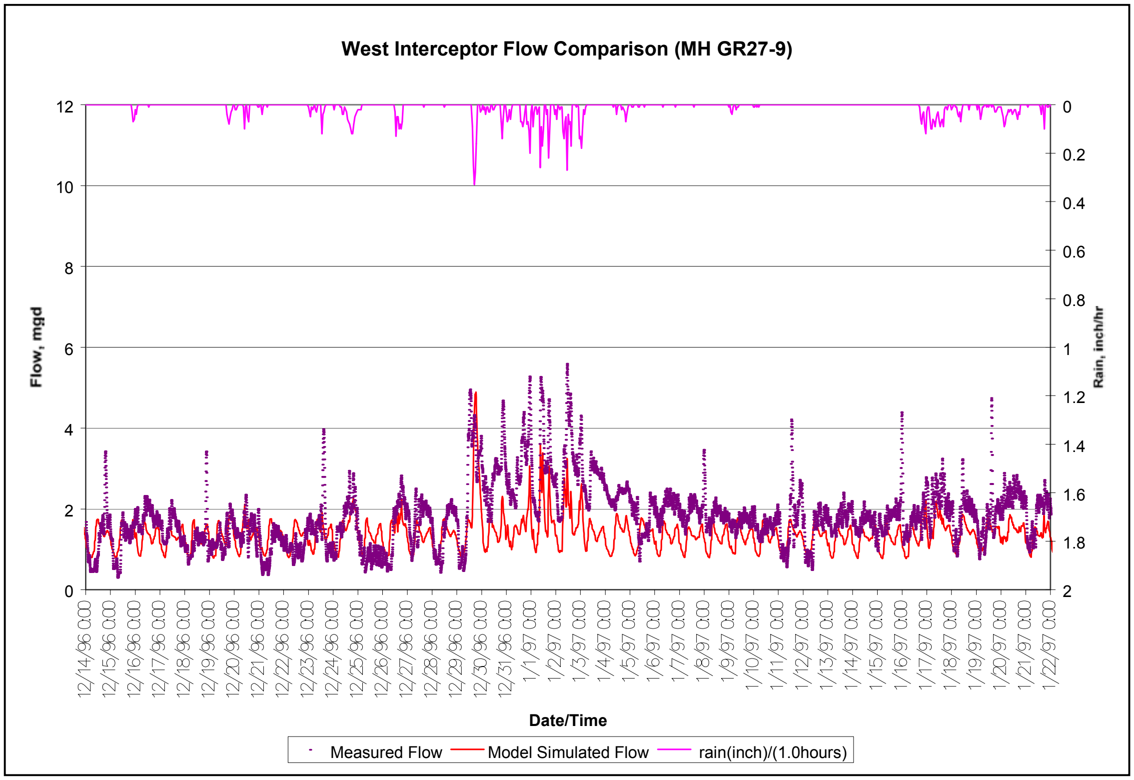

Figure 6

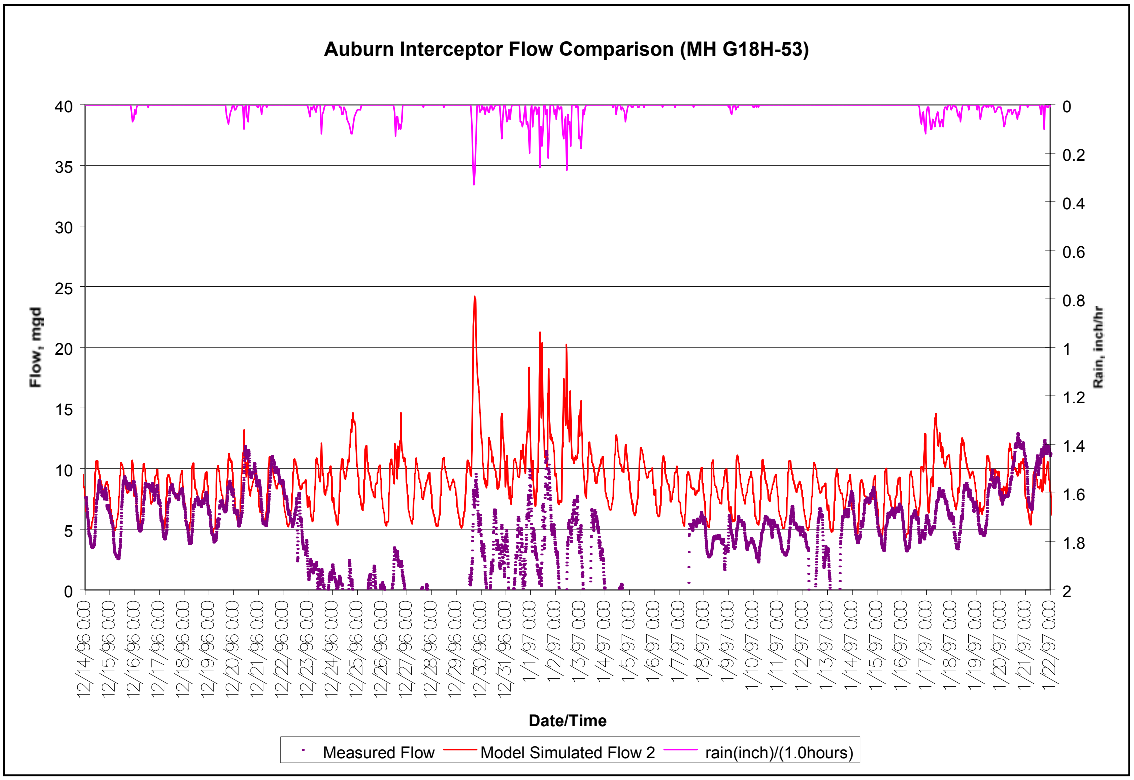

Figure 7

Storm #3 Mar. 13, 1997 – Apr. 1, 1997

Flow data from the flow meters in the M Street Trunk, West Interceptor, and Auburn Interceptor during period of Mar. 13 to Apr. 1, 1997 were used to validate the flow data and model simulated results. Rainfall event during the same period was compared with the flow results. Figure 8 - 10 shows the comparison.

The flow meter in West Interceptor generally shows consistent responses with the rainfall data as well as the model result (Figure 9) with a little drifting at the beginning of the event. The diurnal peak flows before and after the intensive rainfall event is about 2 mgd that is in line with the flow data during November 1998 (Figure 3).

The flow data from M Street Trunk appears to have problems intermittently during this period similar to the data collected during Dec 96. As is shown in Figure 8, the flow measurement is drifting up and down before the intensive rainfall with a certain response to the rainfall. In general, the measurement most likely under estimates the actual flow at this location.

The flow data from Auburn Interceptor also have problems as is seen in Figure 10 with flow measurement drifting up and down during the period. The meter flow was drifting lower with certain response to the rainfall event. It sometimes gets negative readings for a certain period of time. The sum of the measured peak flows from M Street Trunk and West Interceptor is almost the same as the flow measurement from this location indicating that the flow collected from this meter is not reliable.

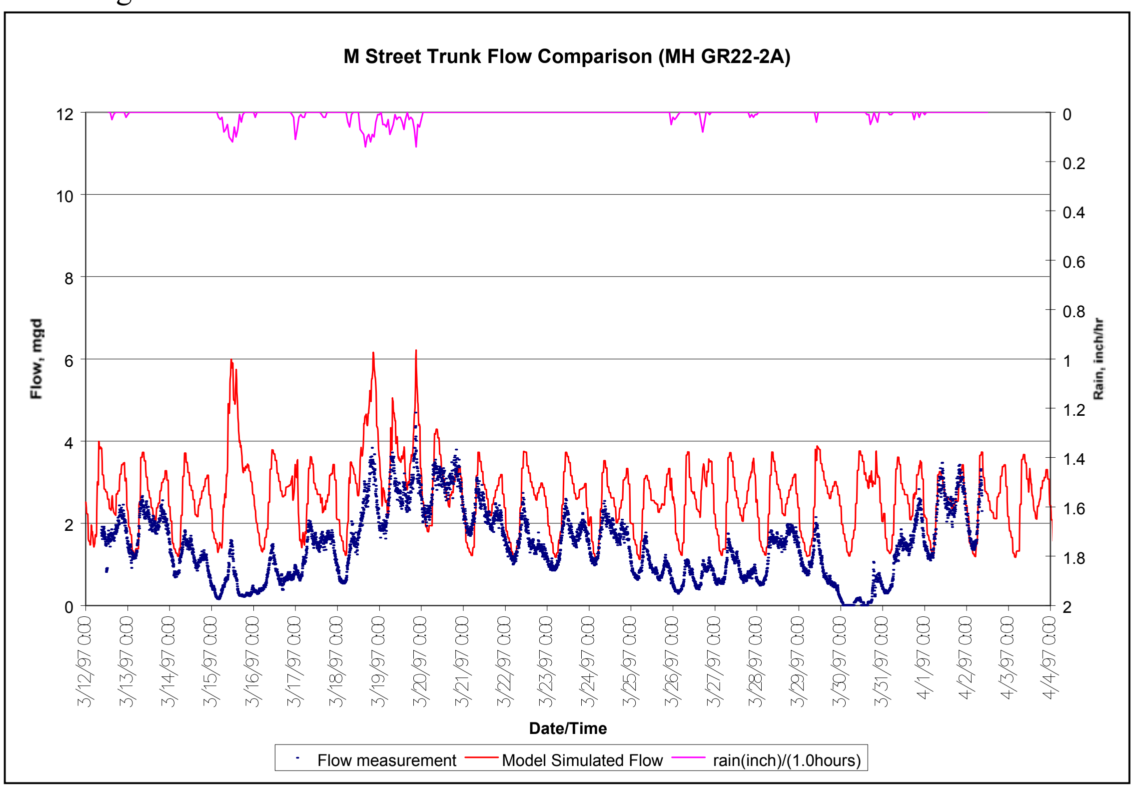

Figure 8

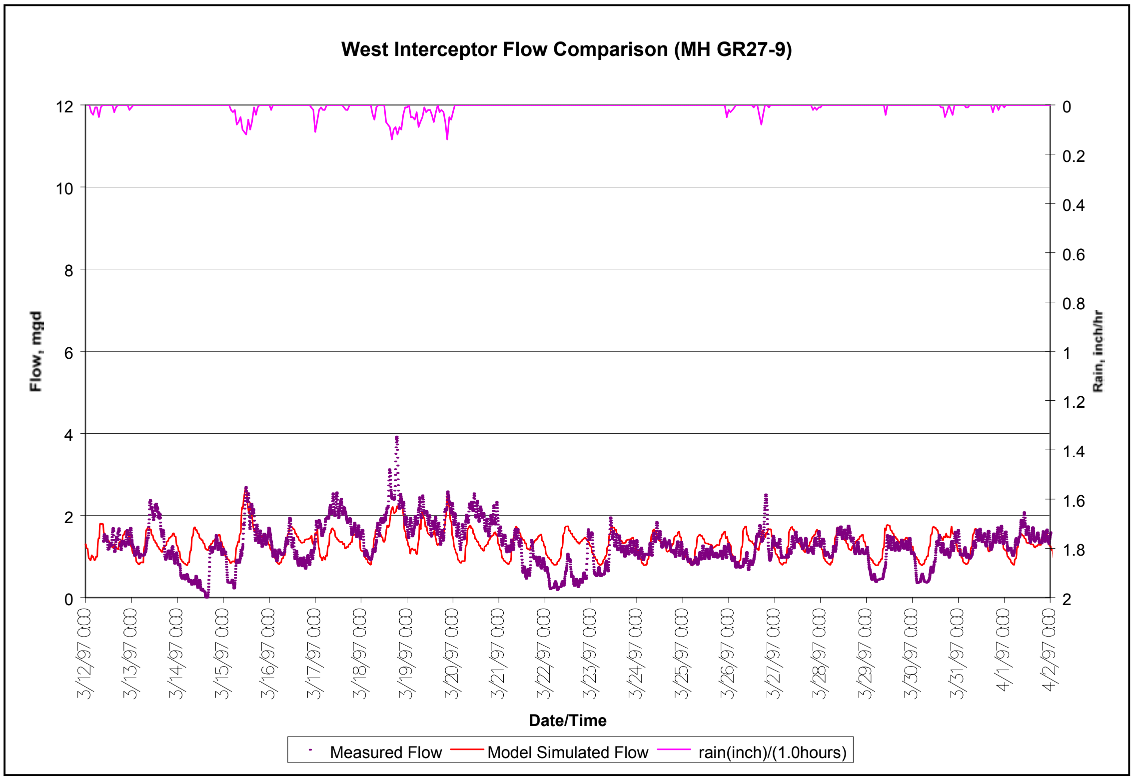

Figure 9

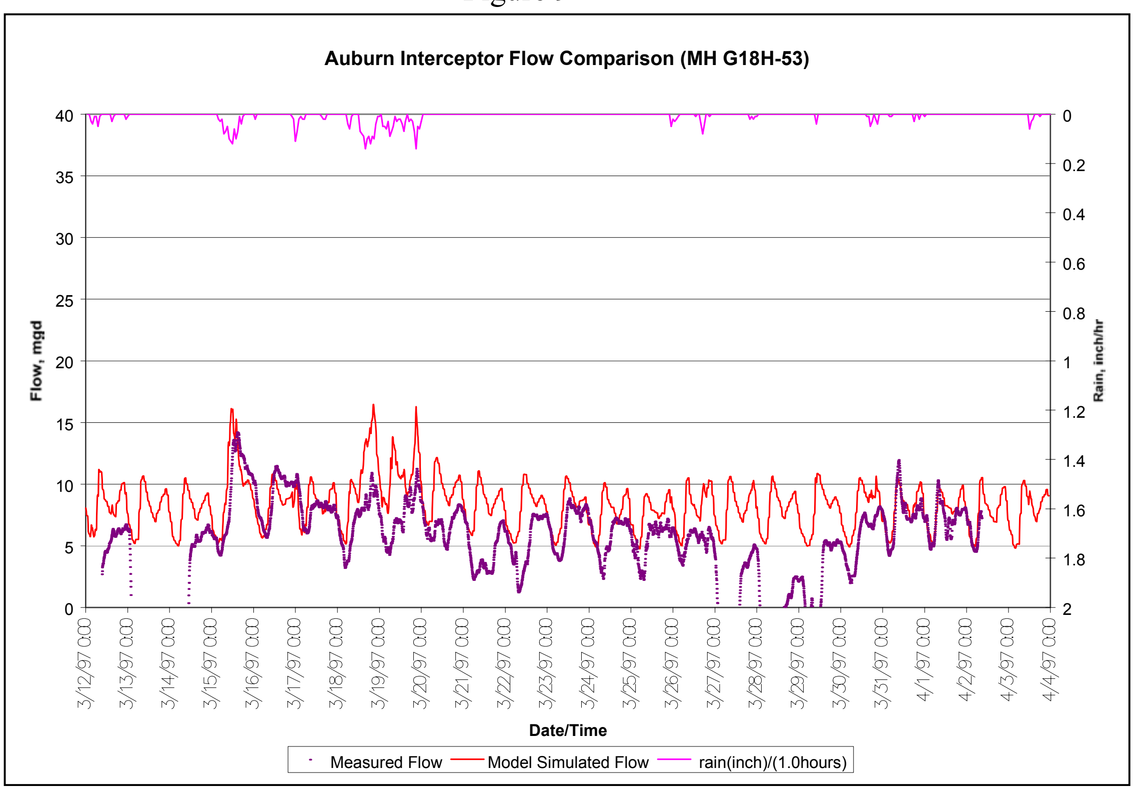

Figure 10

Storm #4 Jan. 26, 1996 – Feb. 25 1996

Flow data from the flow meters in M Street Trunk, West Interceptor, and Auburn Interceptor during period of Jan. 26, 1996 to Feb. 25, 1996 were used to validate the flow data and model simulated results. Rainfall event during the same period was compared with the flow results. Figure 11 - 13 shows the comparison.

The flow meter in West Interceptor generally shows consistent responses with the rainfall data as well as the model result (Figure 9) with a little obvious drifting at the beginning of the event. The diurnal peak flows before and after the intensive rainfall event is about 2 mgd. That is in line with the flow data during November 1998 (Figure 3).

The flow data from M Street Trunk appears having problems intermittently during this period similar to the data collected during Dec 96. As is shown in Figure 8, the flow measurement is drifting up and down before the intensive rainfall. It responds to the rainfall intensity during the rain. In general, the measurement tends to underestimate the flow.

The flow meter in Auburn Interceptor was having problems as is seen in Figure 10. The meter flow was drifting lower with certain response to the rainfall event. The sum of the measured peak flows from M Street Trunk and West Interceptor is almost the same as the flow measurement from this location indicating that the flow collected from this meter is not reliable.

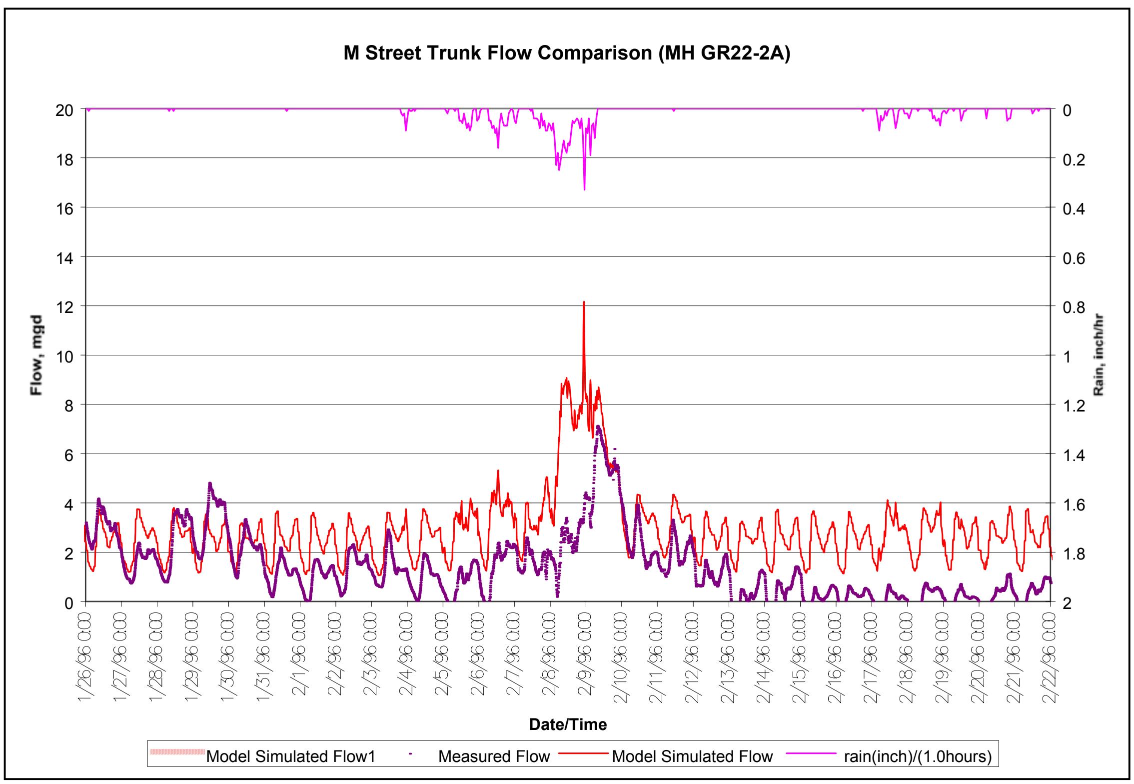

Figure 11

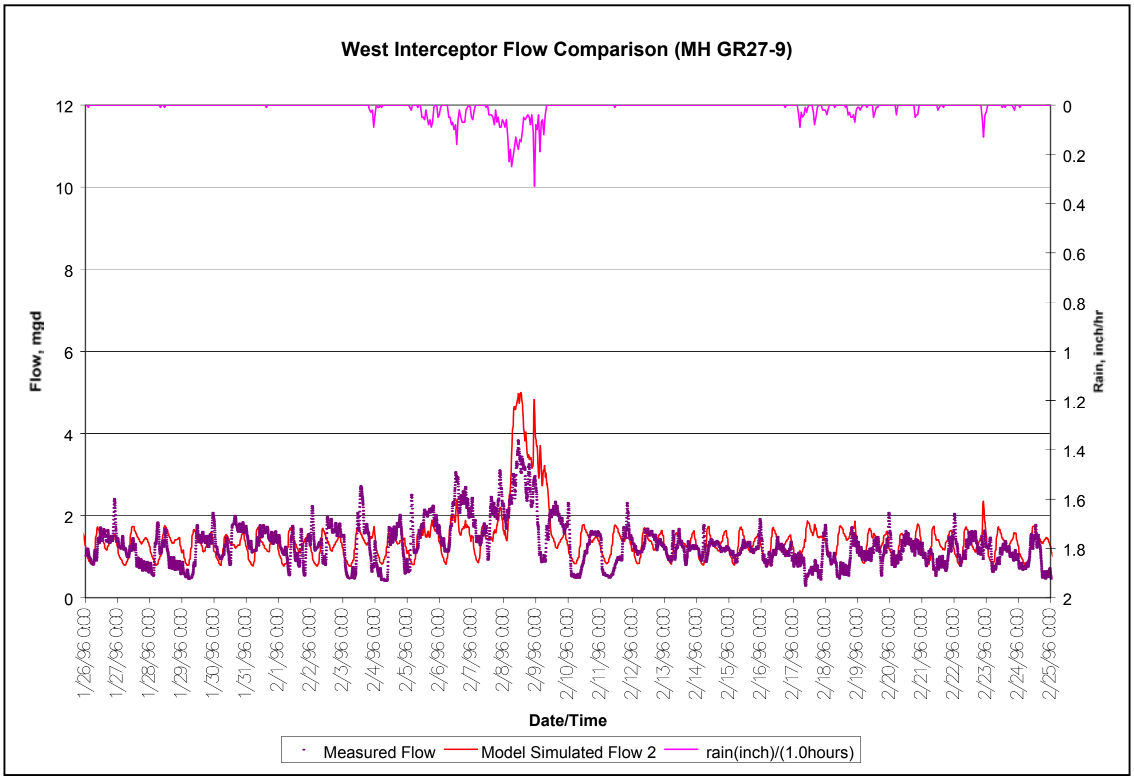

Figure 12

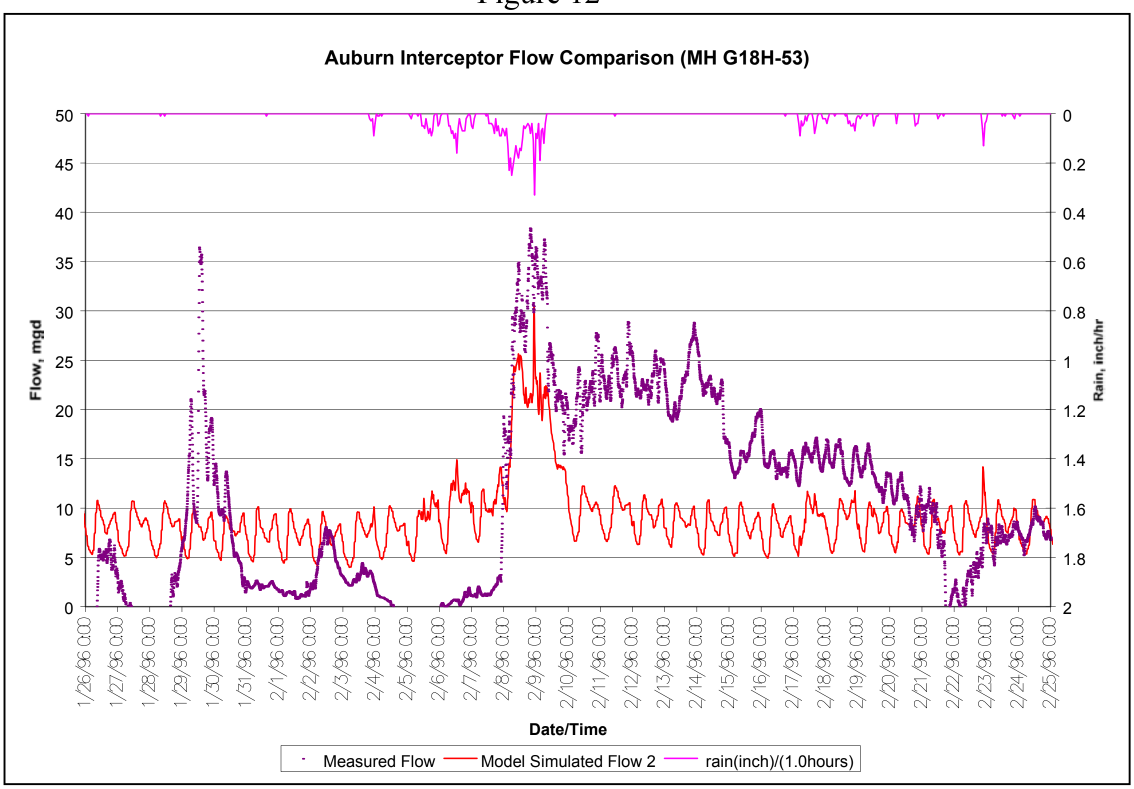

Figure 13

Base flow and Inflow/Infiltration Projection

The calibrated Runoff model was used to make a 49-year simulation based on the rainfall record from Sea-Tac airport during 1948 to 1997. The simulated flow from each basin is then used to establish a frequency curve for peak flow from each basin.

The basin flow projection is based on the following procedure:

Generate flow hydrograph for each basin in the area using the Runoff model and rank peak flow to generate frequency curves for basin peak flow

Find the 20, 10, and 5 year peak flow based on the frequency curves for each basin

Based on TAZ population data, the basin base flow are estimated according to the following flow factors:

Population component	Residential	Commercial	Industrial
Flow per capita (gpd)	60	35	75

1996 base flow (gallon per acre per day) is determined according to the population using above table and the sewered area in each basin. The basin development and local sewer information is determined according to the orthogonal air photo and the sewer map from local agency whenever available, assuming population is evenly distributed in the basin.

Subtract 1996 base flow from the peak flow (20, 10, and 5 year peak) to get I/I peak flow for 1996 conditions

Base flows for 2000 through 2050 are determined based on TAZ population projection with an assumption that all the unsewered population will be sewered and all the basin area will be developed in 2020 with an exception for two basins. This flow projection will generally overestimate the flow in the basins where a very small portion of the area has been developed. The development outside the UGB that may be connected to the sewer system can be considered to compensate the overestimation. The only exceptions are for basin wr-x and basin lh-pc where sewered area in 2020 is projected according to the population growth and Auburn Sewer Comprehensive Plan in comparison with the current orthogonal photo.

Peak I/I is projected assuming the peak I/I flow from the area will increase 7% per decade from current level till 2030 as a result of sewer line degradation.

The total basin peak flow projections are summarized in the following tables.

APPENDIX 240-D

SOOS PLANNING ZONE FLOW PROJECTIONS

Soos Creek service area flow projection:

Prepared by Zhong Ji
June 18, 1999

Given information

- GIS sewer basin boundaries

  The following GIS map shows the study area, including the sewer basin boundaries based on the local sewer lines. The information is available to us at the time of this work

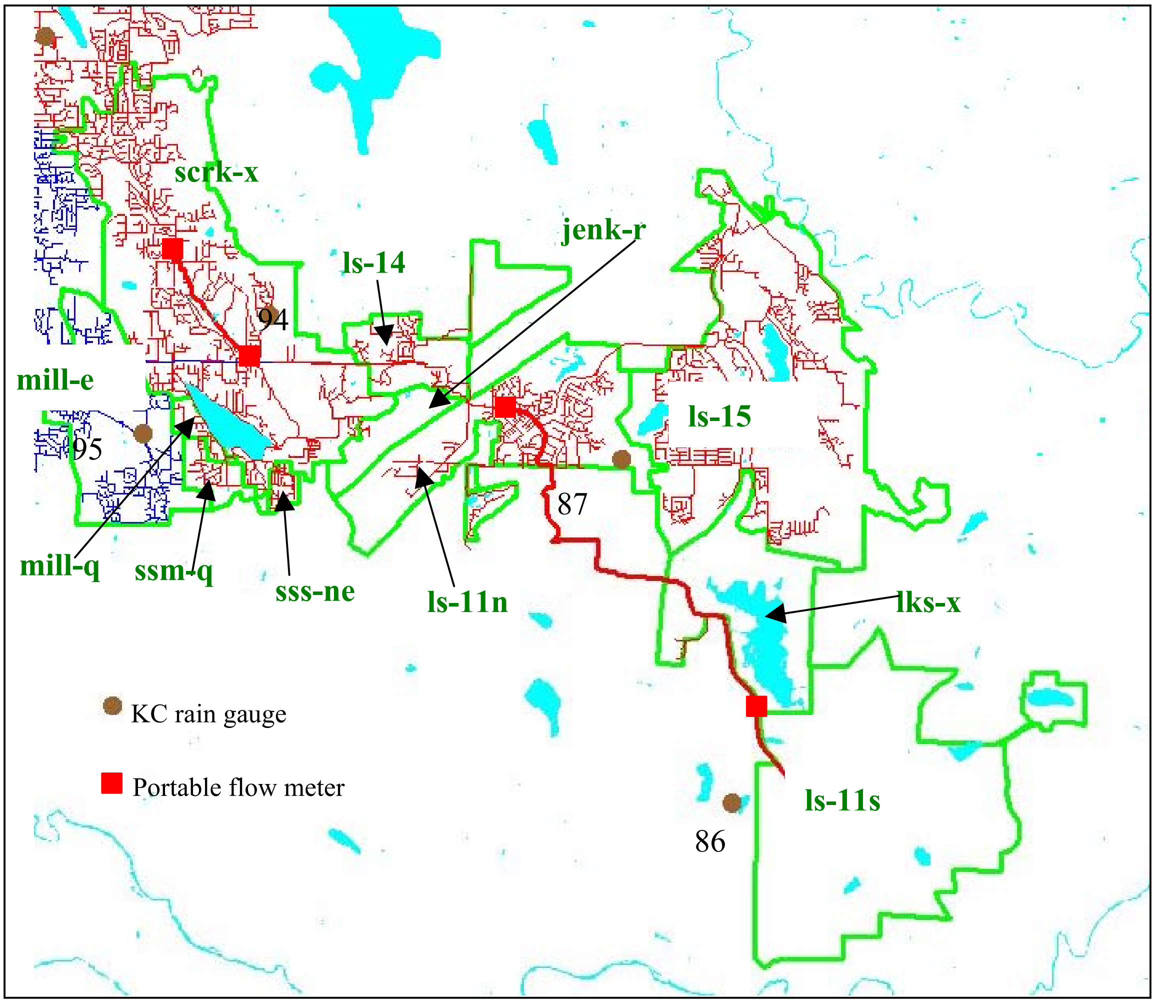

Figure 1 Sewer Basins and Local Sewer Lines

- Flow data

  Limited flow data were collected from this area with King County WTD portable flow monitoring system. There is a flow monitoring station located at MH R18F-38 of the Mill Creek Trunk on the Crow Road. It has been used to collect flow and level data since 1994. The monitoring station measures flow from Soos Creek and Black

Diamond service area and the data can be used for calibration of the Runoff model for the whole service area.

In addition to the flow monitoring station in the Mill Creek Trunk, there are 4 new stations set up recently since mid February 1999. Two meters are located in Black Diamond Trunk downstream of the Black Diamond Force Main. One upstream and one downstream of the trunk as shown in Figure 1. These two stations measure flow from Black Diamond service area or more specifically, flow pumped through Black Diamond pump station. The other two monitoring stations are located upstream and downstream of Clark Fork Trunk that measure flow from part of the Soos Creek basin. The metering period of the 4 new stations did not contain any long-term data.

- Orthogonal Air photo

  Orthogonal air photo taken from this area in 1996 is available through King County Arc/View GIS. When overlapped with local sewer lines, it gives a good information about the portion of basin sewered, developed and undeveloped. The estimation of sewered, unsewered and undeveloped area was done and used for the Runoff model simulation.

- Rainfall information

  A number of King County WLRD rainfall gauges are available for this area as shown in Figure 1. The rainfall data were used for model calibration. Due to limited recording period from these gauge stations, Sea-Tac rainfall record (49 years from 1948 to 1997) was used for long term simulation to get statistics of the basin I/I flow estimates.

Model setup

- The RUNOFF model was set up according to the basin boundaries defined in Fig. 1. There are 11 RUNOFF basins in our model simulation for Soos Creek area. The basin parameters are based on the basin conditions such as basin geometric data, basin conditions, and basin dry weather and wet weather flow conditions subject to model calibration.
- The TRANSPORT model was based on the lift stations, force mains and gravity flow lines in the system. as shown in Figure 2. Capacity of each pump station was built in the model to reflect current restrictions of flow for model calibration. Flows from the Runoff basins are routed to the proper location of the Transport lines.

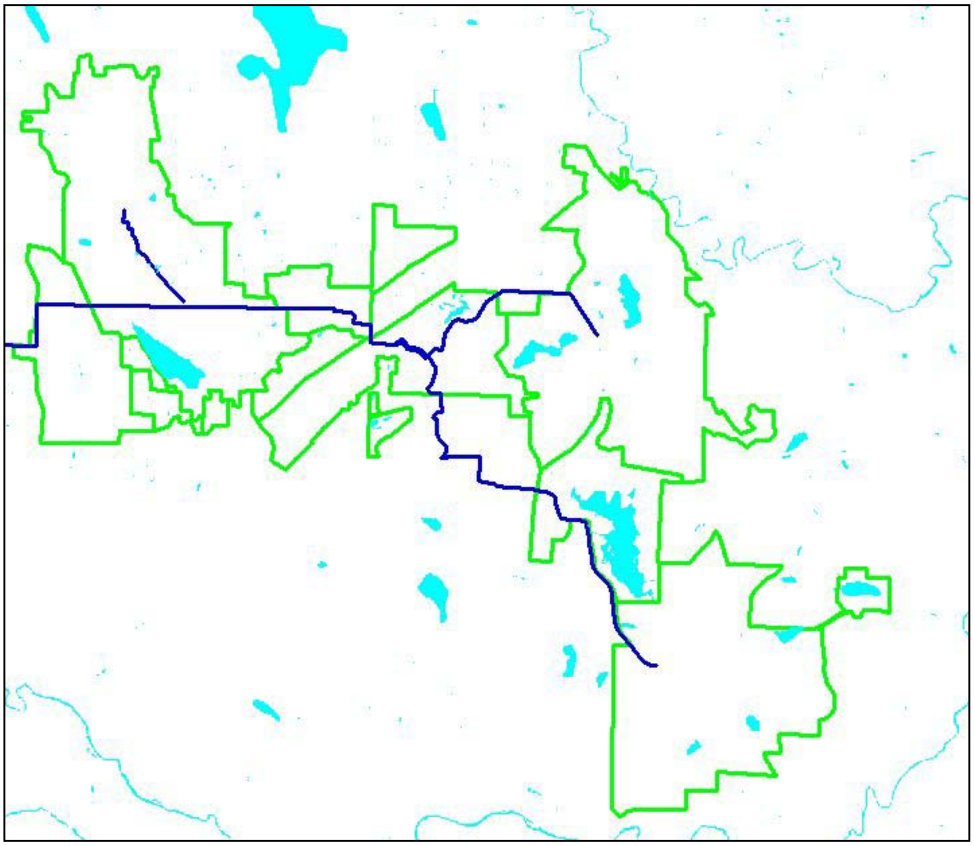

Figure 2. The Runoff basins and Transport Pipes for Soos Creek area

Model calibration

Preliminary model calibration was done based on the data collected from King County WTD portable flow monitoring stations. The calibration was done in progressive steps to make effective use of the limited data. Since the metering period for the 4 new monitoring site did not contain any long-term data, re-iteration of the calibration process should be done when more flow data is available.

- Black Diamond Basin

The calibration started with Black Diamond basin with the data collected since February of 1999. By adjusting dry weather and wet weather inflow /infiltration parameters, the Runoff basin behaves more or less with the measurement data as shown in Figure 3 and Figure 4. Due to unknown reasons, the upstream meter seems to have problems during the storm that starts on February 26th, 1999. The meter seemed to have been out of service until March 18, 1999.

The rainfall events since February are not heavy enough to establish the peak I/I response with certainty. More extensive calibration is required for Black Diamond Basin when flow data corresponding to heavier storm are collected.

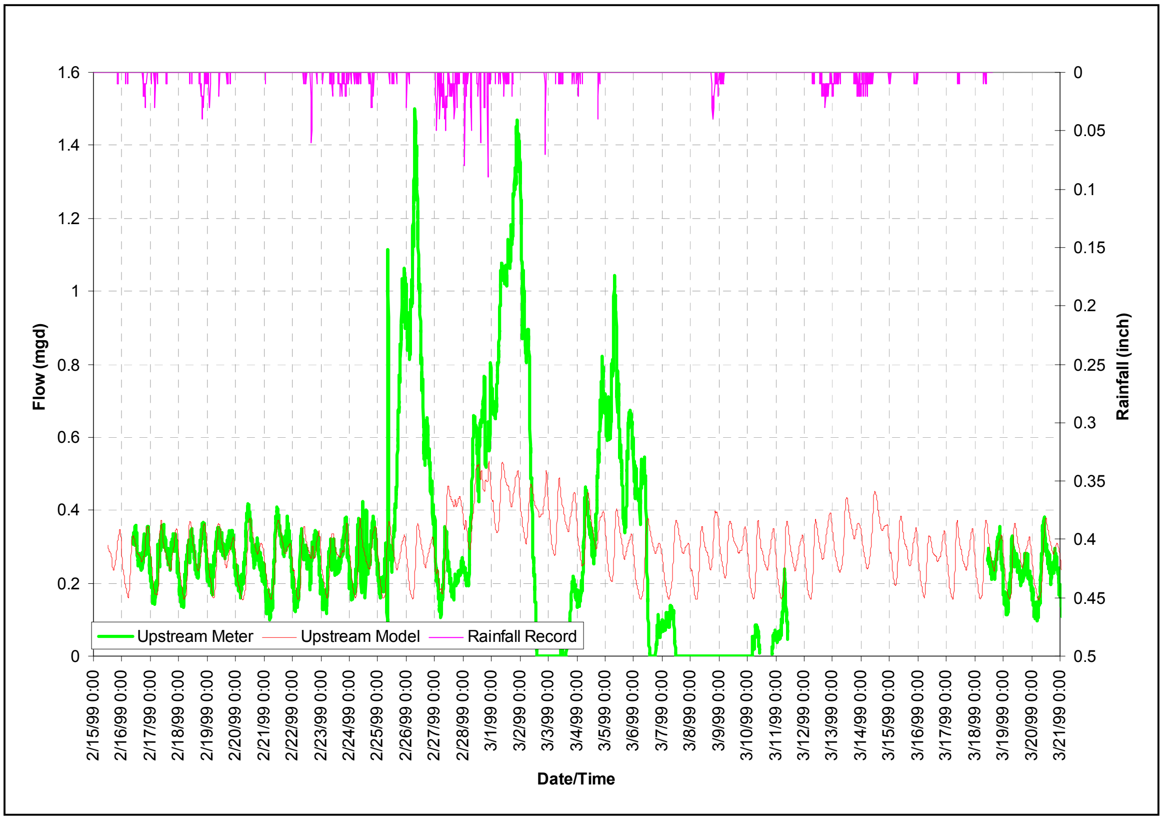

Figure 3. Upstream of Black Diamond Trunk

Figure 4. Downstream of Black Diamond Trunk

- Soos-Mill Basin

We don't have a flow meter that measures flow from the whole basin of Soos-Mill. The meters located in Clark Fork Trunk measures part of the flow from the basin. Our calibration is based on the two meters and the percentage of sewage basin area upstream of the meters in comparison with the air photo and local sewer information.

Figure 5 and 6 is a comparison between the measured and calibrated Runoff model simulated flow. There seems to be no measurement during March 11 to March 17 for the upstream of Clark Fork meter.

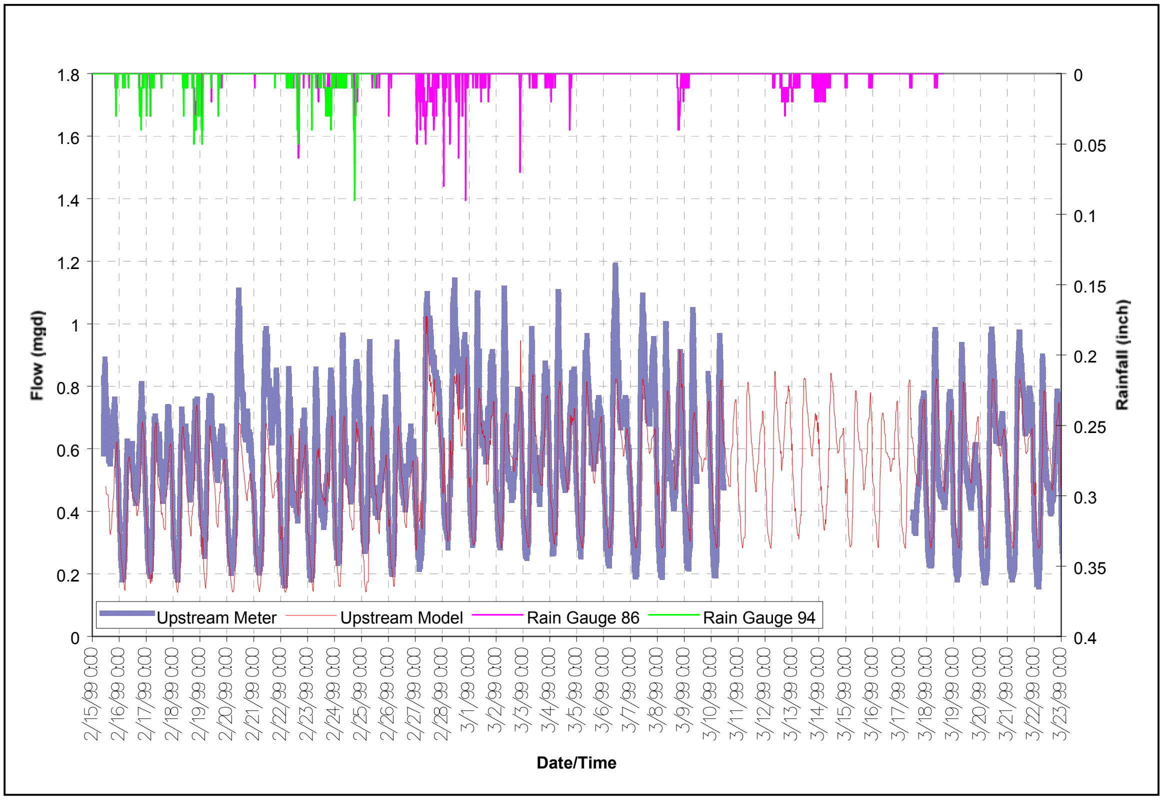

Figure 5. Upstream of Clark Fork

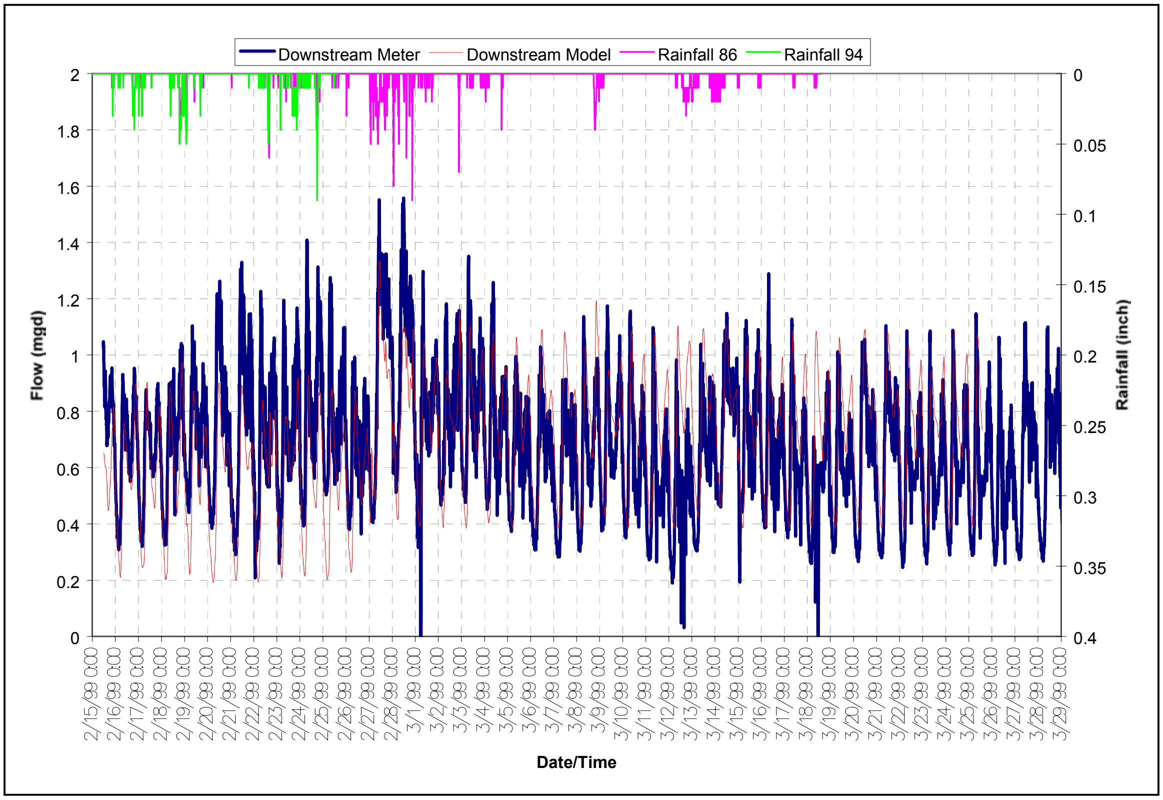

Figure 6. Downstream of Clark Fork

Similar to the Black Diamond basin, the rainfall since February is not heavy enough to establish the peak I/I response with certainty for the Soos-Mill basin. More extensive calibration is required for the basin when flow data corresponding to heavier storms are collected.

- All Basins for Soos Creek area

The parameters for Black Diamond basin and Soos-Mill basin are used for the calibration described in this step.

Flow and level data from the flow meter upstream of Mill Creek Trunk during period of 19th November to December 31, 1998 (during which time a storm with one-year occurrence period) were used to make a calibration of the whole service area. Figure 7 shows the comparison. Except for Black Diamond and Soos-Mill basins, parameters for all other basins were adjusted to make the model simulation comparable to the measurement.

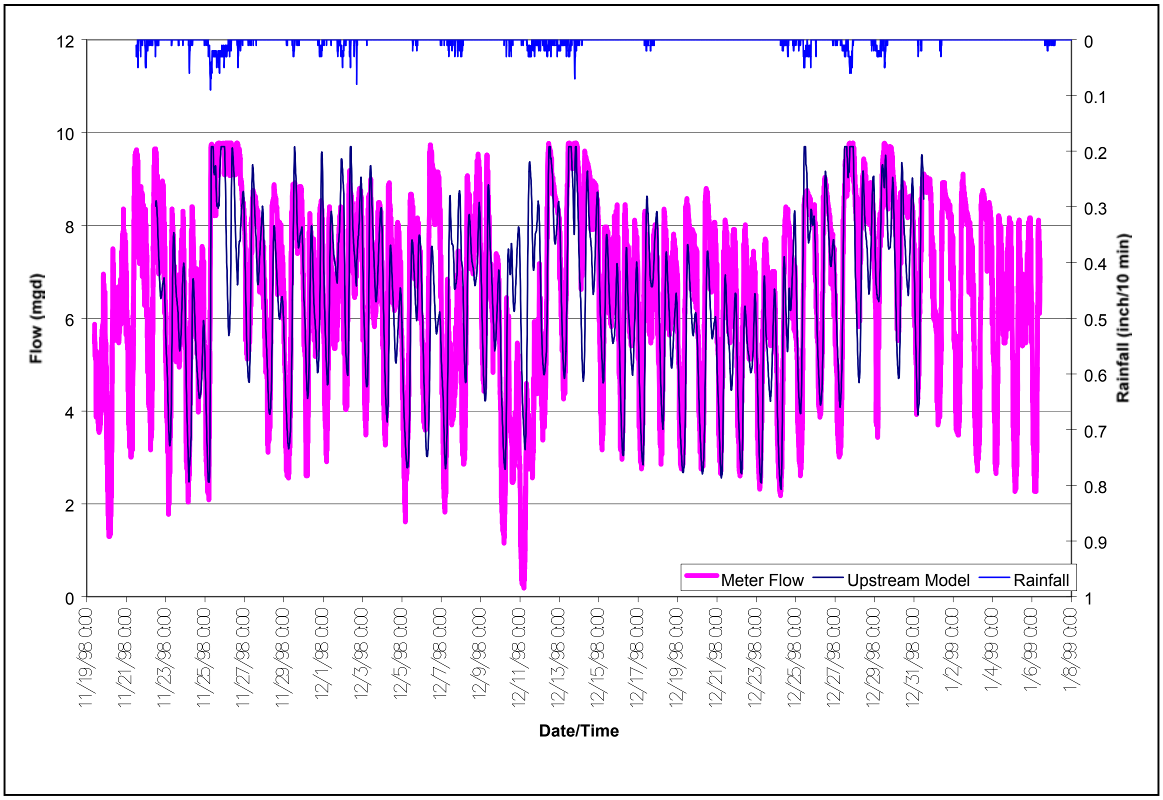

Figure 7. Upstream Mill Creek Interceptor

Base flow and Inflow/Infiltration Projection

The calibrated Runoff model was used to make a 49-year simulation based on the rainfall record from Sea-Tac airport during 1948 to 1997. The simulated flow from each basin is then used to establish a frequency curve of peak flow from the basin.

The basin flow projection is based on the following procedure:

- Generate flow hydrograph for each basin in Soos Creek area using the Runoff model and rank peak flow to generate frequency curves for basin peak flow
- Find the 20, 10, and 5 year peak flow based on the frequency curves for each basin
- Based on TAZ population data, calculate basin base flow according to an empirical base flow setting:

Population component	Residential	Commercial	Industrial
Flow per capita (gpd)	60	35	75

- 1996 base flow (gallon per acre per day) is determined according to the population using above table and sewered area in each basin. The basin development and local sewer information is determined according to the orthogonal air photo and the sewer map from local agency, assuming population is evenly distributed in the basin.

- Subtract 1996 base flow from the peak flow (20, 10, and 5 year peak) to get I/I peak flow for 1996 conditions
- Base flows for 2000 through 2050 are determined based on TAZ population projection assuming all the unsewered population will be sewered and all the basin area will be developed in 2020. The flow projection is based on the assumption that the size of undevelopable area is comparable to development outside the UGB so that a simplified estimate of future flow can be made.
- Peak I/I is projected assuming the peak I/I flow from Soos Creek area will increase 7% per decade from current level till 2030 as a result of sewer line degradation

The basin peak flows are summarized to get the following table.

Summarize all basin peak flows

	20 Year	10 Year	5 Year
1996	12.6	11.9	11.2
2000	15.2	14.3	13.5
2010	21.9	20.7	19.5
2020	29.6	27.9	26.2
2030	31.5	29.7	28.0
2040	31.8	30.1	28.3
2050	32.2	30.5	28.7

Flow projection for Soos Creek basins

Flow projection for basin Is-15

Total GIS area	4041	
Year	1996	2020
Sewered Area	2344	4041
Septic Area	341	0
Sewered land %	58	100
Septic land %	8	0

*7% / decade I/I increases for "degradation"

Area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	2344	87	0.54	229	1734	4.06	4.60
2000	2627	90	0.56	213	1783	4.68	5.24
2010	3334	96	0.61	182	1904	6.35	6.96
2020	4041	100	0.72	179	2026	8.19	8.91
2030	4041	100	0.76	188	2147	8.68	9.44
2040	4041	100	0.81	201	2147	8.68	9.49
2050	4041	100	0.86	213	2147	8.68	9.54

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	2344	87	0.54	229	1651	3.87	4.41
2000	2627	90	0.56	213	1697	4.46	5.02
2010	3334	96	0.61	182	1813	6.04	6.65
2020	4041	100	0.72	179	1929	7.79	8.51
2030	4041	100	0.76	188	2044	8.26	9.02
2040	4041	100	0.81	201	2044	8.26	9.07
2050	4041	100	0.86	213	2044	8.26	9.12

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	2344	87	0.54	229	1568	3.68	4.21
2000	2627	90	0.56	213	1612	4.23	4.79
2010	3334	96	0.61	182	1722	5.74	6.35
2020	4041	100	0.72	179	1832	7.40	8.12
2030	4041	100	0.76	188	1941	7.85	8.60
2040	4041	100	0.81	201	1941	7.85	8.66
2050	4041	100	0.86	213	1941	7.85	8.71

Flow projection for basin **mill-e**

Total GIS area	1327	
Year	1996	2020
Sewered Area	743	1327
Septic Area	269	0
Sewered land %	56	100
Septic land %	20	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	743	73	0.26	344	1812	1.35	1.60
2000	840	79	0.30	358	1863	1.57	1.87
2010	1084	91	0.42	387	1990	2.16	2.58
2020	1327	100	0.55	416	2117	2.81	3.36
2030	1327	100	0.64	479	2244	2.98	3.61
2040	1327	100	0.72	544	2244	2.98	3.70
2050	1327	100	0.81	608	2244	2.98	3.78

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	743	73	0.26	344	1650	1.23	1.48
2000	840	79	0.30	358	1696	1.43	1.73
2010	1084	91	0.42	387	1811	1.96	2.38
2020	1327	100	0.55	416	1927	2.56	3.11
2030	1327	100	0.64	479	2042	2.71	3.35
2040	1327	100	0.72	544	2042	2.71	3.43
2050	1327	100	0.81	608	2042	2.71	3.52

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	743	73	0.26	344	1487	1.11	1.36
2000	840	79	0.30	358	1529	1.28	1.59
2010	1084	91	0.42	387	1633	1.77	2.19
2020	1327	100	0.55	416	1737	2.31	2.86
2030	1327	100	0.64	479	1841	2.44	3.08
2040	1327	100	0.72	544	1841	2.44	3.16
2050	1327	100	0.81	608	1841	2.44	3.25

Flow projection for basin **mill-q**

Total GIS area	104	
Year	1996	2020
Sewered Area	76	104
Septic Area	15	0
Sewered land %	73	100
Septic land %	14	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	76	84	0.02	255	2163	0.16	0.18
2000	81	87	0.02	264	2224	0.18	0.20
2010	92	94	0.03	286	2375	0.22	0.25
2020	104	100	0.03	309	2527	0.26	0.29
2030	104	100	0.04	346	2678	0.28	0.31
2040	104	100	0.04	382	2678	0.28	0.32
2050	104	100	0.04	418	2678	0.28	0.32

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	76	84	0.02	255	2012	0.15	0.17
2000	81	87	0.02	264	2068	0.17	0.19
2010	92	94	0.03	286	2209	0.20	0.23
2020	104	100	0.03	309	2350	0.24	0.28
2030	104	100	0.04	346	2490	0.26	0.29
2040	104	100	0.04	382	2490	0.26	0.30
2050	104	100	0.04	418	2490	0.26	0.30

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	76	84	0.02	255	1860	0.14	0.16
2000	81	87	0.02	264	1912	0.15	0.18
2010	92	94	0.03	286	2042	0.19	0.22
2020	104	100	0.03	309	2173	0.23	0.26
2030	104	100	0.04	346	2303	0.24	0.28
2040	104	100	0.04	382	2303	0.24	0.28
2050	104	100	0.04	418	2303	0.24	0.28

Flow projection for basin **sss-ne**

Total GIS area	76	
Year	1996	2020
Sewered Area	76	76
Septic Area	0	0
Sewered land %	100	100
Septic land %	0	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	76	100	0.01	169	1445	0.11	0.12
2000	76	100	0.01	179	1485	0.11	0.13
2010	76	100	0.02	206	1586	0.12	0.14
2020	76	100	0.02	237	1687	0.13	0.15
2030	76	100	0.02	265	1788	0.14	0.16
2040	76	100	0.02	294	1788	0.14	0.16
2050	76	100	0.02	322	1788	0.14	0.16

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	76	100	0.01	169	1321	0.10	0.11
2000	76	100	0.01	179	1358	0.10	0.12
2010	76	100	0.02	206	1450	0.11	0.13
2020	76	100	0.02	237	1542	0.12	0.14
2030	76	100	0.02	265	1635	0.12	0.14
2040	76	100	0.02	294	1635	0.12	0.15
2050	76	100	0.02	322	1635	0.12	0.15

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	76	100	0.01	169	1197	0.09	0.10
2000	76	100	0.01	179	1230	0.09	0.11
2010	76	100	0.02	206	1314	0.10	0.12
2020	76	100	0.02	237	1398	0.11	0.12
2030	76	100	0.02	265	1481	0.11	0.13
2040	76	100	0.02	294	1481	0.11	0.13
2050	76	100	0.02	322	1481	0.11	0.14

Flow projection for basin **scrk-x**

Total GIS area	3990	
Year	1996	2020
Sewered Area	2032	3990
Septic Area	280	0
Sewered land %	51	100
Septic land %	7	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	2032	88	0.94	462	1199	2.44	3.38
2000	2358	91	1.02	433	1233	2.91	3.93
2010	3174	96	1.21	382	1317	4.18	5.39
2020	3990	100	1.42	356	1401	5.59	7.01
2030	3990	100	1.56	392	1485	5.92	7.49
2040	3990	100	1.71	429	1485	5.92	7.63
2050	3990	100	1.86	466	1485	5.92	7.78

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	2032	88	0.94	462	1102	2.24	3.18
2000	2358	91	1.02	433	1133	2.67	3.69
2010	3174	96	1.21	382	1210	3.84	5.05
2020	3990	100	1.42	356	1287	5.13	6.55
2030	3990	100	1.56	392	1364	5.44	7.00
2040	3990	100	1.71	429	1364	5.44	7.15
2050	3990	100	1.86	466	1364	5.44	7.30

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	2032	88	0.94	462	1004	2.04	2.98
2000	2358	91	1.02	433	1032	2.43	3.46
2010	3174	96	1.21	382	1103	3.50	4.71
2020	3990	100	1.42	356	1173	4.68	6.10
2030	3990	100	1.56	392	1243	4.96	6.52
2040	3990	100	1.71	429	1243	4.96	6.67
2050	3990	100	1.86	466	1243	4.96	6.82

Flow projection for basin **ssm-q**

Total GIS area	196	
Year	1996	2020
Sewered Area	98	196
Septic Area	18	0
Sewered land %	50	100
Septic land %	9	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	98	84	0.03	303	1642	0.16	0.19
2000	114	88	0.03	289	1688	0.19	0.23
2010	155	95	0.04	263	1803	0.28	0.32
2020	196	100	0.05	250	1918	0.38	0.42
2030	196	100	0.05	280	2033	0.40	0.45
2040	196	100	0.06	310	2033	0.40	0.46
2050	196	100	0.07	341	2033	0.40	0.47

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	98	84	0.03	303	1504	0.15	0.18
2000	114	88	0.03	289	1546	0.18	0.21
2010	155	95	0.04	263	1652	0.26	0.30
2020	196	100	0.05	250	1757	0.34	0.39
2030	196	100	0.05	280	1862	0.36	0.42
2040	196	100	0.06	310	1862	0.36	0.43
2050	196	100	0.07	341	1862	0.36	0.43

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	98	84	0.03	303	1367	0.13	0.16
2000	114	88	0.03	289	1405	0.16	0.19
2010	155	95	0.04	263	1500	0.23	0.27
2020	196	100	0.05	250	1596	0.31	0.36
2030	196	100	0.05	280	1692	0.33	0.39
2040	196	100	0.06	310	1692	0.33	0.39
2050	196	100	0.07	341	1692	0.33	0.40

Flow projection for basin **Is-14**

Total GIS area	483	
Year	1996	2020
Sewered Area	246	483
Septic Area	20	0
Sewered land %	51	100
Septic land %	4	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	246	92	0.07	302	1324	0.33	0.40
2000	286	94	0.08	281	1361	0.39	0.47
2010	384	98	0.09	247	1453	0.56	0.65
2020	483	100	0.11	228	1546	0.75	0.86
2030	483	100	0.12	253	1639	0.79	0.91
2040	483	100	0.13	279	1639	0.79	0.93
2050	483	100	0.15	305	1639	0.79	0.94

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	246	92	0.07	302	1213	0.30	0.37
2000	286	94	0.08	281	1247	0.36	0.44
2010	384	98	0.09	247	1332	0.51	0.61
2020	483	100	0.11	228	1417	0.68	0.79
2030	483	100	0.12	253	1501	0.73	0.85
2040	483	100	0.13	279	1501	0.73	0.86
2050	483	100	0.15	305	1501	0.73	0.87

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	246	92	0.07	302	1102	0.27	0.35
2000	286	94	0.08	281	1133	0.32	0.40
2010	384	98	0.09	247	1210	0.46	0.56
2020	483	100	0.11	228	1287	0.62	0.73
2030	483	100	0.12	253	1364	0.66	0.78
2040	483	100	0.13	279	1364	0.66	0.79
2050	483	100	0.15	305	1364	0.66	0.81

Flow projection for basin **Is-11n**

Total GIS area	2146	
Year	1996	2020
Sewered Area	1019	2146
Septic Area	478	0
Sewered land %	47	100
Septic land%	22	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	1019	68	0.32	316	957	0.98	1.30
2000	1207	75	0.37	307	984	1.19	1.56
2010	1676	89	0.48	289	1051	1.76	2.25
2020	2146	100	0.60	278	1118	2.40	3.00
2030	2146	100	0.65	301	1185	2.54	3.19
2040	2146	100	0.70	325	1185	2.54	3.24
2050	2146	100	0.75	349	1185	2.54	3.29

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	1019	68	0.32	316	868	0.88	1.21
2000	1207	75	0.37	307	892	1.08	1.45
2010	1676	89	0.48	289	953	1.60	2.08
2020	2146	100	0.60	278	1013	2.17	2.77
2030	2146	100	0.65	301	1074	2.30	2.95
2040	2146	100	0.70	325	1074	2.30	3.00
2050	2146	100	0.75	349	1074	2.30	3.05

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	1019	68	0.32	316	778	0.79	1.11
2000	1207	75	0.37	307	800	0.96	1.34
2010	1676	89	0.48	289	854	1.43	1.92
2020	2146	100	0.60	278	908	1.95	2.55
2030	2146	100	0.65	301	963	2.07	2.71
2040	2146	100	0.70	325	963	2.07	2.76
2050	2146	100	0.75	349	963	2.07	2.82

Flow projection for basin **jenk-r**

Total GIS area	325	
Year	1996	2020
Sewered Area	36	325
Septic Area	149	0
Sewered land %	11	100
Septic land %	46	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	36	19	0.01	294	1401	0.05	0.06
2000	84	40	0.02	276	1440	0.12	0.14
2010	205	77	0.05	247	1538	0.31	0.37
2020	325	100	0.07	231	1636	0.53	0.61
2030	325	100	0.08	257	1734	0.56	0.65
2040	325	100	0.09	283	1734	0.56	0.66
2050	325	100	0.10	310	1734	0.56	0.66

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	36	19	0.01	294	1275	0.05	0.06
2000	84	40	0.02	276	1311	0.11	0.13
2010	205	77	0.05	247	1400	0.29	0.34
2020	325	100	0.07	231	1489	0.48	0.56
2030	325	100	0.08	257	1579	0.51	0.60
2040	325	100	0.09	283	1579	0.51	0.61
2050	325	100	0.10	310	1579	0.51	0.61

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	36	19	0.01	294	1149	0.04	0.05
2000	84	40	0.02	276	1181	0.10	0.12
2010	205	77	0.05	247	1262	0.26	0.31
2020	325	100	0.07	231	1342	0.44	0.51
2030	325	100	0.08	257	1423	0.46	0.55
2040	325	100	0.09	283	1423	0.46	0.55
2050	325	100	0.10	310	1423	0.46	0.56

Flow projection for basin **ls-11s**

Total GIS A	3867	
Year	1996	2020
Sewd Area	500	3000
Septic Area	50	0
Sewed land %	17	100
Septic land %	1	0

*7% per decade I/I increases for "degradation"

Basin area is in acres, 1996 sewered area is a rough estimate subject to local sewer information

20-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**20 year peak I/I flow (gpad)***	**20 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	500	91	0.11	213	1378	0.69	0.80
2000	917	96	0.11	116	1417	1.30	1.40
2010	1958	99	0.09	48	1513	2.96	3.06
2020	3000	100	0.13	44	1610	4.83	4.96
2030	3000	100	0.13	44	1706	5.12	5.25
2040	3000	100	0.14	48	1706	5.12	5.26
2050	3000	100	0.15	51	1706	5.12	5.27

10-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**10 year peak I/I flow (gpad)***	**10 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	500	91	0.11	213	1332	0.67	0.77
2000	917	96	0.11	116	1369	1.26	1.36
2010	1958	99	0.09	48	1463	2.86	2.96
2020	3000	100	0.13	44	1556	4.67	4.80
2030	3000	100	0.13	44	1649	4.95	5.08
2040	3000	100	0.14	48	1649	4.95	5.09
2050	3000	100	0.15	51	1649	4.95	5.10

5-Year Peak Flow Projection

Year	Sewered basin area	Basin % pop sewered	Basin base flow (mgd)	Basin base flow (gpad)	**5 year peak I/I flow (gpad)***	**5 year peak I/I flow (mgd)**	**Projected basin peak flow (mgd)**
1996	500	91	0.11	213	1286	0.64	0.75
2000	917	96	0.11	116	1322	1.21	1.32
2010	1958	99	0.09	48	1412	2.77	2.86
2020	3000	100	0.13	44	1502	4.51	4.64
2030	3000	100	0.13	44	1592	4.78	4.91
2040	3000	100	0.14	48	1592	4.78	4.92
2050	3000	100	0.15	51	1592	4.78	4.93

APPENDIX 240-E

AUBURN PLANNING ZONE PARALLEL ALTERNATIVE FLOW ROUTING

Task 240 Report: AUBURN PLANNING ZONE - PARALLEL ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
Facility	Up-stream MH #	Down-stream MH #	Dia. (in.)	Manning n	Up-stream Inv Elev	Down-stream Inv Elev	Length (ft)	Slope (ft/ft)	Vfull (fps)	Cap. (mgd)	Proposed Slope	Origin of Flow Percent	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Excess (mgd)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev (ft)	Proposed Diameter (inches)
do not delete this line																												
												10% al-x	**0.34**	0.34	**0.37**	0.37	**0.39**	0.39	**0.40**	0.40			X					
RE*ALPAC FORCEMAIN	PS 2	238	12	0.013	144.50	165.60	2940					100% pac-a	**2.58**	2.92	**3.23**	3.60	**3.43**	3.82	**3.45**	3.85			2010					
RE*ALPAC	238	237	21	0.013	165.60	165.30	400	0.0007	1.81	2.8	0.0012	100% pac-x	**2.71**	5.63	**3.26**	6.86	**3.47**	7.29	**3.57**	7.42	4.61	24	2010					
RE*ALPAC	237	230	21	0.013	165.30	164.90	401	0.0010	2.09	3.2	0.0012	0%		5.63		6.86		7.29		7.42	4.18	24	2010					
RE*ALPAC	230	229	21	0.013	164.90	164.70	135	0.0015	2.54	3.9	0.0012	10% al-x	**0.34**	5.98	**0.37**	7.23	**0.39**	7.69	**0.40**	7.81	3.86	24	2010					
RE*ALPAC	229	228	21	0.013	164.70	164.40	275	0.0011	2.18	3.4	0.0012	0%		5.98		7.23		7.69		7.81	4.42	24	2010					
RE*ALPAC	228	251	21	0.013	164.40	163.90	241	0.0021	3.01	4.7	0.0012	0%		5.98		7.23		7.69		7.81	3.14	21	2010					
RE*ALPAC	251	252	21	0.013	163.90	163.60	366	0.0008		2.9	0.0012	0%		5.98		7.23		7.69		7.81	4.88	24	2010					
RE*ALPAC	252	253	21	0.013	163.60	163.20	328	0.0012	2.31	3.6	0.0012	0%		5.98		7.23		7.69		7.81	4.23	24	2010					
RE*ALPAC	253	254	21	0.013	163.20	162.90	165	0.0018	2.81	4.4	0.0012	0%		5.98		7.23		7.69		7.81	3.44	21	2010					
RE*ALPAC	254	256	21	0.013	162.90	162.60	300	0.0010	2.09	3.2	0.0012	0%		5.98		7.23		7.69		7.81	4.57	24	2010					
	Section		21	0.013		3.00	2611	0.0011	**2.24**	**3.5**	**0.0011**	0%		5.98		7.23		7.69		7.81	4.33	24	2010					24
RE*ALPAC	256	257	24	0.013	162.60	162.50	89	0.0011	2.42	4.9	0.0012	40% al-x	**1.37**	7.35	**1.49**	8.72	**1.57**	9.26	**1.58**	9.39	4.49	24	2010					
RE*ALPAC	257	258	24	0.013	162.50	162.20	251	0.0012	2.50	5.1	0.0012	0%		7.35		8.72		9.26		9.39	4.34	24	2010					
RE*ALPAC	258	259	24	0.013	162.20	161.90	248	0.0012	2.51	5.1	0.0012	0%		7.35		8.72		9.26		9.39	4.30	24	2010					
RE*ALPAC	259	260	24	0.013	161.90	161.70	241	0.0008	2.08	4.2	0.0012	0%		7.35		8.72		9.26		9.39	5.18	27	2010					
RE*ALPAC	260	261	24	0.013	161.70	161.40	241	0.0012	2.55	5.2	0.0012	0%		7.35		8.72		9.26		9.39	4.23	24	2010					
RE*ALPAC	261	290	24	0.013	161.40	161.20	185	0.0011	2.37	4.8	0.0012	0%		7.35		8.72		9.26		9.39	4.58	24	2010					
RE*ALPAC	290	293	24	0.013	161.20	160.80	421	0.0010	2.22	4.5	0.0012	0%		7.35		8.72		9.26		9.39	4.88	24	2010					
RE*ALPAC	293	304	24	0.013	160.80	160.30	438	0.0011	2.44	4.9	0.0012	0%		7.35		8.72		9.26		9.39	4.45	24	2010					
RE*ALPAC	304	305	24	0.013	160.30	159.90	460	0.0009	2.13	4.3	0.0012	0%		7.35		8.72		9.26		9.39	5.08	24	2010					
RE*ALPAC	305	306	24	0.013	159.90	159.40	440	0.0011	2.44	4.9	0.0012	0%		7.35		8.72		9.26		9.39	4.46	24	2010					
RE*ALPAC	306	307	24	0.013	159.40	159.00	446	0.0009	2.16	4.4	0.0012	0%		7.35		8.72		9.26		9.39	5.01	24	2010					
RE*ALPAC	307	308	24	0.013	159.00	158.60	434	0.0009	2.19	4.4	0.0012	0%		7.35		8.72		9.26		9.39	4.95	24	2010					
RE*ALPAC	308	309	24	0.013	158.60	158.10	441	0.0011	2.43	4.9	0.0012	0%		7.35		8.72		9.26		9.39	4.46	24	2010					
RE*ALPAC	309	309B	24	0.013	158.10	157.80	340	0.0009	2.15	4.3	0.0012	0%		7.35		8.72		9.26		9.39	5.05	24	2010					
RE*ALPAC	309B	R83-17	24	0.013	157.80	157.20	345	0.0017	3.01	6.1	0.0012	40% al-x	**1.37**	8.72	**1.49**	10.21	**1.57**	10.83	**1.58**	10.98	4.87	24	2010					
	Section		24	0.013		5.40	5020	0.0011	**2.37**	**4.8**	**0.0011**	0%		8.72		10.21		10.83		10.98	6.18	27	2010					27
RE*AUBWVAL	R83-17	R83-16	24	0.013	157.20	156.40	437	0.0018	3.09	6.3	0.0012	0%		8.72		10.21		10.83		10.98	4.71	24	2010					
RE*AUBWVAL	R83-16	R83-15	24	0.013	156.40	156.00	39	0.0103	7.31	14.8	0.0012	0%		8.72		10.21		10.83		10.98	-3.84	OK	NE					
RE*AUBWVAL	R83-15	R83-14	24	0.013	156.00	154.80	367	0.0033	4.13	8.4	0.0012	0%		8.72		10.21		10.83		10.98	2.61	21	2010					
RE*AUBWVAL	R83-14	R83-13	24	0.013	154.80	154.00	369	0.0022	3.36	6.8	0.0012	0%		8.72		10.21		10.83		10.98	4.16	24	2010					
RE*AUBWVAL	R83-13	R83-12	24	0.013	154.00	153.60	408	0.0010	2.26	4.6	0.0012	0%		8.72		10.21		10.83		10.98	6.40	27	2010					
RE*AUBWVAL	R83-12	R83-11	24	0.013	153.60	153.30	371	0.0008	2.05	4.2	0.0012	0%		8.72		10.21		10.83		10.98	6.81	27	2010					
RE*AUBWVAL	R83-11	R83-10	24	0.013	153.30	153.10	339	0.0006	1.75	3.6	0.0012	0%		8.72		10.21		10.83		10.98	7.42	30	2010					
RE*AUBWVAL	R83-10	R83-09	24	0.013	153.10	153.00	270	0.0004	1.39	2.8	0.0012	0%		8.72		10.21		10.83		10.98	8.16	30	2010					
RE*AUBWVAL	R83-09	R83-08	24	0.013	153.00	152.50	221	0.0023	3.43	7.0	0.0012	0%		8.72		10.21		10.83		10.98	4.01	24	2010					
RE*AUBWVAL	R83-08	R83-07	24	0.013	152.50	152.10	467	0.0009	2.11	4.3	0.0012	0%		8.72		10.21		10.83		10.98	6.69	27	2010					
RE*AUBWVAL	R83-07	R83-06	24	0.013	152.10	151.80	380	0.0008	2.03	4.1	0.0012	0%		8.72		10.21		10.83		10.98	6.87	27	2010					
RE*AUBWVAL	R83-06	R83-05	24	0.013	151.80	151.20	538	0.0011	2.41	4.9	0.0012	0%		8.72		10.21		10.83		10.98	6.09	27	2010					
RE*AUBWVAL	R83-05	R83-04	24	0.013	151.20	150.80	475	0.0008	2.09	4.2	0.0012	0%		8.72		10.21		10.83		10.98	6.73	27	2010					
RE*AUBWVAL	R83-04	R83-03	24	0.013	150.80	150.20	480	0.0013	2.55	5.2	0.0012	0%		8.72		10.21		10.83		10.98	5.80	27	2010					
RE*AUBWVAL	R83-03	R83-02	24	0.013	150.20	149.80	482	0.0008	2.08	4.2	0.0012	0%		8.72		10.21		10.83		10.98	6.76	27	2010					
RE*AUBWVAL	R83-02	R83-01	24	0.013	149.80	149.20	235	0.0026	3.65	7.4	0.0012	0%		8.72		10.21		10.83		10.98	3.58	24	2010					
	Section		24	0.013		8.00	5878	0.0014	**2.66**	**5.4**	**0.0014**	0%		8.72		10.21		10.83		10.98	5.58	27	2010					27

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AUBURN PLANNING ZONE - PARALLEL ALTERNATIVE

Facility	Up-stream MH #	Down-stream MH #	Dia. (in.)	Manning n	Up-stream Inv Elev	Down-stream Inv Elev	Length (ft)	Slope (ft/ft)	Vfull (fps)	Cap. (mgd)	Herrera Proposed Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (mgd)	2010 Design Flow Total (mgd)	2020 Design Flow Inflow (mgd)	2020 Design Flow Total (mgd)	2030 Design Flow Inflow (mgd)	2030 Design Flow Total (mgd)	2050 Design Flow Inflow (mgd)	2050 Design Flow Total (mgd)	Excess (mgd)	Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev (ft)	Proposed Diameter (inches)
												100% fwne-w	2.39	11.11	4.21	14.42	4.45	15.28	4.48	15.46			X					
WVAL	R83-01	81-2	36	0.013	149.15	148.95	375	0.0005	2.18	10.0	0.0038	25% aub3-s	0.36	11.47	0.44	14.86	0.47	15.75	0.48	15.93	5.97	21	2010					
WVAL	81-2	81-1	30	0.013	149.00	148.50	210	0.0024	4.09	12.9	0.0038	0%		11.47		14.86		15.75		15.93	2.98	18	2020					
WVAL	81-1	80-8	42	0.013	148.50	148.42	70	0.0011	3.54	22.0	0.0038	0%		11.47		14.86		15.75		15.93	-6.07	OK	NE					
WVAL x Main St*	80-8	80-7	42	0.013	148.42	147.60	335	0.0024	5.19	32.2	0.0038	0%		11.47		14.86		15.75		15.93	-16.27	OK	NE					
WVAL	80-7	80-6	30	0.013	147.60	147.00	167	0.0036	5.02	15.9	0.0038	0%		11.47		14.86		15.75		15.93	0.03	3	2050					
WVAL	80-6	80-5	30	0.013	147.00	146.10	482	0.0019	3.62	11.5	0.0038	25% aub3-s	0.36	11.83	0.44	15.30	0.47	16.22	0.48	16.41	4.94	21	2010					
WVAL	80-5	80-3	30	0.013	146.10	145.16	510	0.0018	3.60	11.4	0.0038	0%		11.83		15.30		16.22		16.41	5.01	21	2010					
WVAL	80-3	80-2	30	0.013	145.16	144.50	441	0.0015	3.24	10.3	0.0038	0%		11.83		15.30		16.22		16.41	6.14	21	2010					
WVAL	80-2	80-1	30	0.013	144.50	143.70	450	0.0018	3.53	11.2	0.0038	0%		11.83		15.30		16.22		16.41	5.22	21	2010					
WVAL	80-1	79-23	30	0.013	143.70	142.80	447	0.0020	3.76	11.9	0.0038	0%		11.83		15.30		16.22		16.41	4.50	21	2020					
WVAL	79-23	79-22	30	0.013	142.80	142.25	465	0.0012	2.88	9.1	0.0038	0%		11.83		15.30		16.22		16.41	7.29	24	2010					
WVAL	79-22	79-21	30	0.013	142.25	141.95	450	0.0007	2.16	6.8	0.0038	0%		11.83		15.30		16.22		16.41	9.56	27	2010					
WVAL	79-21	79-20	30	0.013	141.95	141.70	410	0.0006	2.07	6.6	0.0038	0%		11.83		15.30		16.22		16.41	9.85	27	2010					
WVAL	79-20	79-19	30	0.013	141.70	141.48	363	0.0006	2.06	6.5	0.0038	0%		11.83		15.30		16.22		16.41	9.88	27	2010					
WVAL	79-19	79-18	30	0.013	141.48	141.26	362	0.0006	2.07	6.5	0.0038	0%		11.83		15.30		16.22		16.41	9.86	27	2010					
WVAL	79-18	79-17	30	0.013	141.26	141.00	425	0.0006	2.07	6.6	0.0038	0%		11.83		15.30		16.22		16.41	9.85	27	2010					
WVAL	79-17	79-16	42	0.013	140.89	139.87	260	0.0039	6.57	40.8	0.0038	0%		11.83		15.30		16.22		16.41	-24.36	OK	NE					
WVAL	79-16	79-15X	30	0.013	139.87	139.67	360	0.0006	1.97	6.3	0.0038	0%		11.83		15.30		16.22		16.41	10.16	27	2010					
WVAL	79-15X	79-15	30	0.013	139.67	139.04	90	0.0070	7.01	22.2	0.0038	0%		11.83		15.30		16.22		16.41	-5.79	OK	NE					
WVAL	79-15	79-14	30	0.013	139.04	138.15	410	0.0022	3.90	12.4	0.0038	0%		11.83		15.30		16.22		16.41	4.05	18	2020					
WVAL	79-14	1	30	0.013	138.15	137.92	389	0.0006	2.04	6.5	0.0038	0%		11.83		15.30		16.22		16.41	9.95	27	2010					
	Section		24	0.013		11.23	7470	0.0015	**2.80**	**5.7**	**0.0015**	0%		11.83		15.30		16.22		16.41	10.73	33	2010					33
WVAL	1	79-13	42	0.013	137.92	136.50	380	0.0037	6.41	39.8	0.0038	0%		11.83		15.30		16.22		16.41	-23.38	OK	NE					
WVAL	79-13	79-12	30	0.013	136.50	136.40	100	0.0010	2.65	8.4	0.0038	0%		11.83		15.30		16.22		16.41	8.00	24	2010					
											0.0038	100% fwne-x	1.71	13.54	2.12	17.41	2.24	18.46	2.26	18.67			X					
WVAL	79-12	79-11	30	0.013	136.40	135.95	484	0.0009	2.55	8.1	0.0038	25% aub3-s	0.36	13.90	0.44	17.85	0.47	18.93	0.48	19.14	11.05	27	2010					
WVAL	79-11	79-10	30	0.013	135.95	135.70	289	0.0009	2.46	7.8	0.0038	0%		13.90		17.85		18.93		19.14	11.34	27	2010					
WVAL	79-10	79-9	30	0.013	135.70	135.41	364	0.0008	2.37	7.5	0.0038	0%		13.90		17.85		18.93		19.14	11.65	27	2010					
WVAL	79-9	79-8	30	0.013	135.41	135.12	361	0.0008	2.38	7.5	0.0038	0%		13.90		17.85		18.93		19.14	11.62	27	2010					
WVAL	79-8	79-6	30	0.013	135.12	134.83	362	0.0008	2.37	7.5	0.0038	0%		13.90		17.85		18.93		19.14	11.63	27	2010					
WVAL	79-6	79-5	30	0.013	134.83	134.50	411	0.0008	2.37	7.5	0.0038	0%		13.90		17.85		18.93		19.14	11.63	27	2010					
WVAL	79-5	79-4	30	0.013	134.50	134.09	496	0.0008	2.41	7.6	0.0038	0%		13.90		17.85		18.93		19.14	11.52	27	2010					
WVAL	79-4	79-3	30	0.013	134.09	133.70	490	0.0008	2.36	7.5	0.0038	0%		13.90		17.85		18.93		19.14	11.66	27	2010					
WVAL	79-3	79-2	30	0.013	133.70	133.42	373	0.0008	2.30	7.3	0.0038	25% aub3-s	0.36	14.27	0.44	18.30	0.47	19.40	0.48	19.62	12.35	27	2010					
WVAL	79-2	79-1	30	0.013	133.42	133.40	39	0.0005	1.91	6.0	0.0038	0%		14.27		18.30		19.40		19.62	13.57	30	2010					
WVAL	79-1	R18H-65	42	0.013	133.40	133.19	12	0.0175	13.87	86.1	0.0038	0%		14.27		18.30		19.40		19.62	-66.48	OK	NE					
	Section		30	0.013		4.73	4160	0.0011	**2.83**	**8.9**	**0.0011**	0%		14.27		18.30		19.40		19.62	10.67	33	2010					33
TO AUBURN3.R18H-65																												

Task 240 Report: AUBURN PLANNING ZONE - PARALLEL ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
Facility	Up-stream MH #	Down-stream MH #	Dia. (in.)	Manning n	Up-stream Inv Elev	Down-stream Inv Elev	Length (ft)	Slope (ft/ft)	Vfull (fps)	Cap. (mgd)	Proposed Slope	Origin of Flow Percent	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Excess (mgd)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev (ft)	Proposed Diameter (inches)
												100% lh-pc	1.73	1.73	3.08	3.08	3.29	3.29	3.35	3.35			X					
L. HILLS*			24	0.013	194.74	174.98	7269	0.0017	3.01	6.1	0.0027	100% wr-x	3.84	5.57	6.39	9.47	6.78	10.07	6.84	10.18	4.08	21	2020					
REPLACEMENT REQUIRED			27	0.013		19.76	7269	0.0027	4.07	10.4	0.0027	0%		5.57		9.47		10.07		10.18	-0.26	OK	NE					27
RE*WINTSEWR	GR27-44	GR27-43	24	0.013	174.98	172.67	329	0.0070	6.05	12.3	0.0030	40% wi-x	4.30	9.87	4.79	14.26	5.06	15.13	5.05	15.23	2.97	18	2020					
RE*WINTSEWR	GR27-43	GR27-42	24	0.013	172.67	170.67	295	0.0068	5.94	12.0	0.0030	0%		9.87		14.26		15.13		15.23	3.19	18	2020					
RE*WINTSEWR	GR27-42	GR27-41	24	0.013	170.67	168.78	268	0.0071	6.06	12.3	0.0030	0%		9.87		14.26		15.13		15.23	2.94	18	2020					
RE*WINTSEWR	GR27-41	GR27-40	24	0.013	168.78	168.52	123	0.0021	3.32	6.7	0.0030	0%		9.87		14.26		15.13		15.23	8.50	27	2010					
RE*WINTSEWR	GR27-40	GR27-39	24	0.013	168.52	167.20	412	0.0032	4.09	8.3	0.0030	0%		9.87		14.26		15.13		15.23	6.95	24	2010					
RE*WINTSEWR	GR27-39	GR27-38	24	0.013	167.20	166.40	399	0.0020	3.23	6.6	0.0030	0%		9.87		14.26		15.13		15.23	8.68	27	2010					
RE*WINTSEWR	GR27-38	GR27-37	24	0.013	166.40	165.60	410	0.0020	3.19	6.5	0.0030	0%		9.87		14.26		15.13		15.23	8.77	27	2010					
RE*WINTSEWR	GR27-37	GR27-36	24	0.013	165.60	164.80	411	0.0019	3.19	6.5	0.0030	0%		9.87		14.26		15.13		15.23	8.78	27	2010					
RE*WINTSEWR	GR27-36	GR27-35	24	0.013	164.80	163.90	410	0.0022	3.38	6.9	0.0030	0%		9.87		14.26		15.13		15.23	8.38	27	2010					
RE*WINTSEWR	GR27-35	GR27-34	24	0.013	163.90	163.10	419	0.0019	3.15	6.4	0.0030	0%		9.87		14.26		15.13		15.23	8.84	27	2010					
RE*WINTSEWR	GR27-34	GR27-33	24	0.013	163.10	162.50	414	0.0014	2.75	5.6	0.0030	0%		9.87		14.26		15.13		15.23	9.66	27	2010					
RE*WINTSEWR	GR27-33	GR27-32A	24	0.013	162.50	162.40	117	0.0009	2.11	4.3	0.0030	0%		9.87		14.26		15.13		15.23	10.96	27	2010					
RE*WINTSEWR	GR27-32A	GR27-32	24	0.013	162.40	162.10	160	0.0019	3.13	6.3	0.0030	0%		9.87		14.26		15.13		15.23	8.90	27	2010					
RE*WINTSEWR	GR27-32	GR27-31	24	0.013	162.10	162.00	111	0.0009	2.17	4.4	0.0030	0%		9.87		14.26		15.13		15.23	10.84	27	2010					
CORRODED :	UPSTREAM		24	0.013		12.98	4278	0.0030	3.98	8.1	0.0030	0%		9.87		14.26		15.13		15.23	7.18	24	2010					24
RE*WINTSEWR	GR27-31	GR27-30	24	0.013	162.00	161.50	239	0.0021	3.30	6.7	0.0021	0%		9.87		14.26		15.13		15.23	8.54	27	2010					
RE*WINTSEWR	GR27-30	GR27-29	24	0.013	161.50	161.40	64	0.0016	2.86	5.8	0.0021	0%		9.87		14.26		15.13		15.23	9.45	30	2010					
RE*WINTSEWR	GR27-29	GR27-28	24	0.013	161.40	160.80	409	0.0015	2.77	5.6	0.0021	0%		9.87		14.26		15.13		15.23	9.63	30	2010					
RE*WINTSEWR	GR27-28	GR27-27	24	0.013	160.80	160.20	410	0.0015	2.76	5.6	0.0021	0%		9.87		14.26		15.13		15.23	9.63	30	2010					
RE*WINTSEWR	GR27-27	GR27-26	24	0.013	160.20	159.60	398	0.0015	2.80	5.7	0.0021	0%		9.87		14.26		15.13		15.23	9.55	30	2010					
RE*WINTSEWR	GR27-26	GR27-25	24	0.013	159.60	158.20	248	0.0056	5.42	11.0	0.0021	0%		9.87		14.26		15.13		15.23	4.24	21	2020					
	Section		24	0.013		3.80	1768	0.0021	3.35	6.8	0.0021	0%		9.87		14.26		15.13		15.23	8.45	27	2010					27
RE*WINTSEWR	GR27-25	GR27-24	36	0.013	158.20	157.60	433	0.0014	3.52	16.1	0.0013	0%		9.87		14.26		15.13		15.23	-0.83	OK	NE					
RE*WINTSEWR	GR27-24	GR27-23	36	0.013	157.60	157.00	445	0.0013	3.47	15.8	0.0013	0%		9.87		14.26		15.13		15.23	-0.61	OK	NE					
RE*WINTSEWR	GR27-23	GR27-22	36	0.013	157.00	156.50	445	0.0011	3.17	14.5	0.0013	0%		9.87		14.26		15.13		15.23	0.77	12	2030					
RE*WINTSEWR	GR27-22	GR27-21	36	0.013	156.50	155.90	443	0.0014	3.48	15.9	0.0013	0%		9.87		14.26		15.13		15.23	-0.64	OK	NE					
RE*WINTSEWR	GR27-21	GR27-20	36	0.013	155.90	155.50	310	0.0013	3.40	15.5	0.0013	0%		9.87		14.26		15.13		15.23	-0.26	OK	NE					
RE*WINTSEWR	GR27-20	GR27-19	36	0.013	155.50	154.90	421	0.0014	3.57	16.3	0.0013	55% wi-x	5.91	15.77	6.59	20.85	6.95	22.08	6.95	22.18	5.89	27	2020					
RE*WINTSEWR	GR27-19	GR27-18	36	0.013	154.90	154.20	444	0.0016	3.76	17.1	0.0013	0%		15.77		20.85		22.08		22.18	5.05	24	2020					
RE*WINTSEWR	GR27-18	GR27-17	36	0.013	154.20	153.10	498	0.0022	4.45	20.3	0.0013	0%		15.77		20.85		22.08		22.18	1.90	18	2020					
RE*WINTSEWR*	GR27-17	GR27-16	36	0.013	153.10	153.00	490	0.0002	1.35	6.2	0.0013	0%		15.77		20.85		22.08		22.18	16.02	39	2010					
RE*WINTSEWR	GR27-16	GR27-15	36	0.013	153.00	152.40	499	0.0012	3.28	15.0	0.0013	0%		15.77		20.85		22.08		22.18	7.22	27	2010					
RE*WINTSEWR	GR27-15	GR27-14	36	0.013	152.40	151.80	488	0.0012	3.32	15.1	0.0013	0%		15.77		20.85		22.08		22.18	7.05	27	2010					
	Section		36	0.013		6.40	4916	0.0013	3.41	15.6	0.0013	0%		15.77		20.85		22.08		22.18	6.61	27	2010					27
RE*WINTSEWR	GR27-14	GR27-13	42	0.013	151.80	151.20	543	0.0011	3.49	21.6	0.0011	0%		15.77		20.85		22.08		22.18	0.55	12	2030					
RE*WINTSEWR	GR27-13	GR27-12B	42	0.013	151.20	150.90	110	0.0027	5.48	34.0	0.0011	0%		15.77		20.85		22.08		22.18	-11.81	OK	NE					
RE*WINTSEWR	GR27-12B	GR27-12	42	0.013	150.90	150.80	250	0.0004	2.10	13.0	0.0011	0%		15.77		20.85		22.08		22.18	9.16	33	2010					
RE*WINTSEWR	GR27-12	GR27-11	42	0.013	150.80	150.40	309	0.0013	3.77	23.4	0.0011	0%		15.77		20.85		22.08		22.18	-1.24	OK	NE					
RE*WINTSEWR	GR27-11	GR27-10	42	0.013	150.40	150.00	428	0.0009	3.21	19.9	0.0011	0%		15.77		20.85		22.08		22.18	2.28	21	2020					
RE*WINTSEWR	GR27-10	GR27-09	42	0.013	150.00	149.80	206	0.0010	3.27	20.3	0.0011	0%		15.77		20.85		22.08		22.18	1.90	18	2020					
	Section		42	0.013		2.00	1846	0.0011	3.45	21.4	0.0011	0%		15.77		20.85		22.08		22.18	0.75	12	2030					12
RE*WINTSEWR	GR27-09	GR27-08	42	0.013	149.80	149.10	503	0.0014	3.91	24.3	0.0014	0%		15.77		20.85		22.08		22.18	-2.10	OK	NE					
RE*WINTSEWR	GR27-08	GR27-07	42	0.013	149.10	148.50	499	0.0012	3.64	22.6	0.0014	0%		15.77		20.85		22.08		22.18	-0.39	OK	NE					
RE*WINTSEWR	GR27-07	GR27-06	42	0.013	148.50	147.80	479	0.0015	4.01	24.9	0.0014	0%		15.77		20.85		22.08		22.18	-2.70	OK	NE					
RE*WINTSEWR	GR27-06	GR27-05	42	0.013	147.80	147.30	426	0.0012	3.59	22.3	0.0014	0%		15.77		20.85		22.08		22.18	-0.12	OK	NE					
RE*WINTSEWR	GR27-05	GR27-04	42	0.013	147.30	146.80	398	0.0013	3.72	23.1	0.0014	0%		15.77		20.85		22.08		22.18	-0.89	OK	NE					
RE*WINTSEWR	GR27-04	GR27-03	42	0.013	146.80	146.60	121	0.0017	4.26	26.5	0.0014	0%		15.77		20.85		22.08		22.18	-4.28	OK	NE					
RE*WINTSEWR	GR27-03	GR27-02	42	0.013	146.60	145.70	636	0.0014	3.94	24.5	0.0014	0%		15.77		20.85		22.08		22.18	-2.31	OK	NE					
RE*WINTSEWR	GR27-02	GR27-01	42	0.013	145.70	144.80	628	0.0014	3.97	24.6	0.0014	5% wi-x	0.54	16.31	0.60	21.45	0.63	22.71	0.63	22.81	-1.83	OK	NE					
RE*WINTSEWR	GR27-01	R18H-78A	42	0.013	144.80	144.50	65	0.0046	7.12	44.2	0.0014	0%		16.31		21.45		22.71		22.81	-21.40	OK	NE					
	Section		42	0.013		5.30	3755	0.0014	3.94	24.5	0.0014	0%		16.31		21.45		22.71		22.81	-1.64	OK	NE					OK
TO AUBURN3.R18H-78A																												

Task 240 Report: AUBURN PLANNING ZONE - PARALLEL ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
Facility	Up-stream MH #	Down-stream MH #	Dia. (in.)	Manning n	Up-stream Inv Elev	Down-stream Inv Elev	Length (ft)	Slope (ft/ft)	Vfull (fps)	Cap. (mgd)	Proposed Slope	Origin of Flow Percent	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Excess (mgd)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ–Δfull	BW elev (ft)	Proposed Diameter (inches)
M STREET TRUNK												100% seg-x	1.26	1.26	1.94	1.94	2.05	2.05	2.06	2.06			X					
RE*MSTTRUNK	GR19-49	GR19-48	18	0.013	200.10	199.10	422	0.0024	2.90	3.3	0.0023	70% mst-s	6.47	7.73	7.44	9.38	7.93	9.99	8.20	10.26	6.95	24	2010					
RE*MSTTRUNK	GR19-48	GR19-47	18	0.013	199.10	198.30	385	0.0021	2.72	3.1	0.0023	0%		7.73		9.38		9.99		10.26	7.16	27	2010					
RE*MSTTRUNK	GR19-47	GR19-46	18	0.013	198.30	198.05	102	0.0025	2.95	3.4	0.0023	0%		7.73		9.38		9.99		10.26	6.90	24	2010					
RE*MSTTRUNK	GR19-46	GR19-45	18	0.013	198.05	197.10	414	0.0023	2.86	3.3	0.0023	0%		7.73		9.38		9.99		10.26	7.00	27	2010					
RE*MSTTRUNK	GR19-45	GR19-44	18	0.013	197.10	196.40	322	0.0022	2.78	3.2	0.0023	0%		7.73		9.38		9.99		10.26	7.09	27	2010					
RE*MSTTRUNK	GR19-44	GR20-43	18	0.013	196.40	195.60	330	0.0024	2.94	3.3	0.0023	7% mst-s	0.65	8.38	0.74	10.12	0.79	10.78	0.82	11.08	7.73	27	2010					
Section			18	0.013		4.50	1975	0.0023	**2.85**	**3.2**	**0.0023**	0%		8.38		10.12		10.78		11.08	7.83	27	2010					27
RE*MSTTRUNK	GR20-43	GR20-42	18	0.013	195.60	194.00	308	0.0052	4.30	4.9	0.0056	0%		8.38		10.12		10.78		11.08	6.18	21	2010					
RE*MSTTRUNK	GR20-42	GR20-41	18	0.013	194.00	192.40	320	0.0050	4.22	4.8	0.0056	0%		8.38		10.12		10.78		11.08	6.27	21	2010					
RE*MSTTRUNK	GR20-41	GR20-40	18	0.013	192.40	190.80	321	0.0050	4.21	4.8	0.0056	0%		8.38		10.12		10.78		11.08	6.28	21	2010					
RE*MSTTRUNK	GR20-40	GR21-39	18	0.013	190.80	188.90	362	0.0052	4.32	4.9	0.0056	0%		8.38		10.12		10.78		11.08	6.15	21	2010					
RE*MSTTRUNK	GR21-39	GR21-38	18	0.013	188.90	187.30	329	0.0049	4.16	4.7	0.0056	0%		8.38		10.12		10.78		11.08	6.33	21	2010					
RE*MSTTRUNK	GR21-38	GR21-37	18	0.013	187.30	185.60	340	0.0050	4.22	4.8	0.0056	8% mst-s	0.74	9.12	0.85	10.97	0.91	11.69	0.94	12.01	7.21	21	2010					
RE*MSTTRUNK	GR21-37	GR21-36A	18	0.013	185.60	185.20	77	0.0052	4.30	4.9	0.0056	0%		9.12		10.97		11.69		12.01	7.12	21	2010					
RE*MSTTRUNK	GR21-36A	GR21-36	18	0.013	185.20	183.90	252	0.0052	4.28	4.9	0.0056	0%		9.12		10.97		11.69		12.01	7.14	21	2010					
RE*MSTTRUNK	GR21-36	GR21-35	18	0.013	183.90	180.20	285	0.0130	6.79	7.7	0.0056	0%		9.12		10.97		11.69		12.01	4.27	18	2010					
RE*MSTTRUNK	GR21-35	GR21-34	18	0.013	180.20	178.40	342	0.0053	4.32	4.9	0.0056	0%		9.12		10.97		11.69		12.01	7.08	21	2010					
RE*MSTTRUNK	GR21-34	GR21-33	18	0.013	178.40	176.20	428	0.0051	4.27	4.9	0.0056	0%		9.12		10.97		11.69		12.01	7.14	21	2010					
RE*MSTTRUNK	GR21-33	GR21-32	18	0.013	176.20	174.10	430	0.0049	4.16	4.7	0.0056	0%		9.12		10.97		11.69		12.01	7.26	21	2010					
RE*MSTTRUNK	GR21-32	GR21-31	18	0.013	174.10	172.10	383	0.0052	4.31	4.9	0.0056	15% mst-s	1.39	10.51	1.59	12.57	1.70	13.39	1.76	13.77	8.86	24	2010					
RE*MSTTRUNK	GR21-31	GR22-30	18	0.013	172.10	170.20	382	0.0050	4.20	4.8	0.0056	0%		10.51		12.57		13.39		13.77	8.98	24	2010					
Section			18	0.013		25.40	4559	0.0056	**4.45**	**5.1**	**0.0056**	0%		10.51		12.57		13.39		13.77	8.70	24	2010					24
RE*MSTTRUNK	GR22-30	GR22-29	24	0.013	163.70	163.40	177	0.0017	2.97	6.0	0.0018	0% mst-s		10.51		12.57		13.39		13.77	7.74	27	2010					
RE*MSTTRUNK	GR22-29	GR22-28	24	0.013	163.40	163.10	165	0.0018	3.08	6.2	0.0018	0%		10.51		12.57		13.39		13.77	7.53	27	2010					
RE*MSTTRUNK	GR22-28	GR22-27	24	0.013	163.10	162.80	167	0.0018	3.06	6.2	0.0018	0%		10.51		12.57		13.39		13.77	7.57	27	2010					
RE*MSTTRUNK	GR22-27	GR22-26	24	0.013	162.80	162.50	160	0.0019	3.13	6.3	0.0018	0%		10.51		12.57		13.39		13.77	7.43	27	2010					
RE*MSTTRUNK	GR22-26	GR22-25	24	0.013	162.50	162.30	153	0.0013	2.61	5.3	0.0018	0%		10.51		12.57		13.39		13.77	8.48	27	2010					
RE*MSTTRUNK	GR22-25	GR22-24	24	0.013	162.30	162.00	128	0.0023	3.50	7.1	0.0018	0%		10.51		12.57		13.39		13.77	6.69	27	2010					
Section			24	0.013		1.70	950	0.0018	**3.06**	**6.2**	**0.0018**	0%		10.51		12.57		13.39		13.77	7.58	27	2010					27
RE*MSTTRUNK	GR22-24	GR22-23	30	0.013	162.00	161.70	659	0.0005	1.79	5.7	0.0020	0%		10.51		12.57		13.39		13.77	8.10	27	2010					
RE*MSTTRUNK	GR22-23	GR22-22B	30	0.013	161.70	161.30	605	0.0007	2.16	6.8	0.0020	0%		10.51		12.57		13.39		13.77	6.94	27	2010					
RE*MSTTRUNK	GR22-22B	GR22-22A	30	0.013	161.30	161.10	302	0.0007	2.16	6.8	0.0020	0%		10.51		12.57		13.39		13.77	6.94	27	2010					
RE*MSTTRUNK	GR22-22A	GR22-22	30	0.013	161.11	160.42	203	0.0034	4.87	15.4	0.0020	0%		10.51		12.57		13.39		13.77	-1.67	OK	NE					
RE*MSTTRUNK	GR22-22	GR22-21A	30	0.013	160.42	159.79	188	0.0034	4.87	15.4	0.0020	0%		10.51		12.57		13.39		13.77	-1.67	OK	NE					
RE*MSTTRUNK	GR22-21A	GR22-21	30	0.013	159.79	159.64	20	0.0073	7.18	22.7	0.0020	100% mst-e	3.24	13.75	3.98	16.54	4.23	17.61	4.30	18.07	-4.67	OK	NE					
RE*MSTTRUNK	GR22-21	GR22-20	30	0.013	159.60	158.90	357	0.0020	3.71	11.7	0.0020	0%		13.75		16.54		17.61		18.07	6.32	24	2010					
RE*MSTTRUNK	GR22-20	GR22-19	30	0.013	158.80	158.00	400	0.0020	3.75	11.9	0.0020	0%		13.75		16.54		17.61		18.07	6.21	24	2010					
RE*MSTTRUNK	GR22-19	GR22-18	30	0.013	157.90	156.90	487	0.0021	3.80	12.0	0.0020	0%		13.75		16.54		17.61		18.07	6.04	24	2010					
RE*MSTTRUNK	GR22-18	GR22-17A	30	0.013	156.90	156.10	336	0.0024	4.09	12.9	0.0020	80% mst-n	1.42	15.17	1.61	18.16	1.73	19.35	1.83	19.90	6.95	27	2010					
RE*MSTTRUNK	GR22-17A	GR22-17	30	0.013	156.10	155.60	240	0.0021	3.82	12.1	0.0020	0%		15.17		18.16		19.35		19.90	7.79	27	2010					
RE*MSTTRUNK	GR22-17	GR22-16	30	0.013	155.60	155.40	59	0.0034	4.88	15.5	0.0020	0%		15.17		18.16		19.35		19.90	4.45	21	2020					
RE*MSTTRUNK	GR22-16	GR22-15	30	0.013	155.40	153.90	729	0.0021	3.80	12.0	0.0020	0%		15.17		18.16		19.35		19.90	7.86	27	2010					
RE*MSTTRUNK	GR22-15	GR22-14	30	0.013	153.90	153.80	13	0.0077	7.35	23.3	0.0020	0%		15.17		18.16		19.35		19.90	-3.37	OK	NE					
RE*MSTTRUNK	GR22-14	GR22-13A	30	0.013	153.80	152.50	687	0.0019	3.64	11.5	0.0020	0%		15.17		18.16		19.35		19.90	8.36	27	2010					
RE*MSTTRUNK	GR22-13A	GR22-13	30	0.013	152.50	151.80	236	0.0030	4.56	14.5	0.0020	0%		15.17		18.16		19.35		19.90	5.45	24	2010					
RE*MSTTRUNK	GR22-13	GR22-12A	30	0.013	151.80	151.50	134	0.0022	3.96	12.6	0.0020	0%		15.17		18.16		19.35		19.90	7.34	27	2010					
RE*MSTTRUNK	GR22-12A	GR22-12	30	0.013	151.50	150.30	518	0.0023	4.03	12.8	0.0020	0%		15.17		18.16		19.35		19.90	7.12	27	2010					
RE*MSTTRUNK	GR22-12	GR22-11	30	0.013	150.30	148.30	652	0.0031	4.64	14.7	0.0020	0%		15.17		18.16		19.35		19.90	5.20	24	2010					
Section			30	0.013		13.70	6825	0.0020	**3.75**	**11.9**	**0.0020**	0%		15.17		18.16		19.35		19.90	8.01	27	2010					27
RE*MSTTRUNK	GR22-11	GR22-10	36	0.013	148.30	147.90	704	0.0006	2.26	10.3	0.0008	0%		15.17		18.16		19.35		19.90	9.61	33	2010					
												20% mst-n	0.36	15.53	0.40	18.56	0.43	19.78	0.46	20.36			X					
												100% mst-ne	1.13	16.65	1.72	20.28	1.84	21.62	1.89	22.25			X					
RE*MSTTRUNK	GR22-10	GR22-08A	36	0.013	147.90	147.00	1079	0.0008	2.73	12.5	0.0008	100% sss-sw	0.97	17.62	1.36	21.64	1.45	23.07	1.48	23.73	11.28	36	2010					
RE*MSTTRUNK	GR22-08A	GR22-07	36	0.013	147.00	146.60	528	0.0008	2.60	11.9	0.0008	0%		17.62		21.64		23.07		23.73	11.86	36	2010					
RE*MSTTRUNK	GR22-07	GR22-06	36	0.013	146.60	146.40	237	0.0008	2.75	12.5	0.0008	0%		17.62		21.64		23.07		23.73	11.20	36	2010					
RE*MSTTRUNK	GR22-06	GR22-05	36	0.013	146.40	146.30	13	0.0077	8.30	37.8	0.0008	0%		17.62		21.64		23.07		23.73	-14.11	OK	NE					
RE*MSTTRUNK	GR22-05	GR22-04	36	0.013	146.30	146.10	269	0.0007	2.58	11.8	0.0008	0%		17.62		21.64		23.07		23.73	11.97	36	2010					
RE*MSTTRUNK	GR22-04	GR22-02A	36	0.013	146.10	145.60	655	0.0008	2.61	11.9	0.0008	0%		17.62		21.64		23.07		23.73	11.81	36	2010					
RE*MSTTRUNK	GR22-02A	GR22-02	36	0.013	145.60	145.30	348	0.0009	2.78	12.7	0.0008	0%		17.62		21.64		23.07		23.73	11.06	36	2010					
RE*MSTTRUNK	GR22-02	R18H-78A	36	0.013	145.20	144.80	464	0.0009	2.78	12.7	0.0008	0%		17.62		21.64		23.07		23.73	11.06	36	2010					
Section			36	0.013		3.50	4297	0.0008	**2.70**	**12.3**	**0.0008**	0%		17.62		21.64		23.07		23.73	11.42	36	2010					36
TO AUBURN3.R18H-78A																												

Task 240 Report: AUBURN PLANNING ZONE - PARALLEL ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
Facility	Up-stream MH #	Down-stream MH #	Dia. (in.)	Manning n	Up-stream Inv Elev	Down-stream Inv Elev	Length (ft)	Slope (ft/ft)	Vfull (fps)	Cap. (mgd)	Proposed Slope	Origin of Flow Percent	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Inflow (mgd)	Total (mgd)	Excess (mgd)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ–Δfull	BW elev (ft)	Proposed Diameter (inches)
do not delete row																												
												100% MSTTRK GR22-02	17.62	17.62	21.64	21.64	23.07	23.07	23.73	23.73			X					
AUBURN 3 TRUNK												100% WINTSEWR.G R27-01	16.31	33.93	21.45	43.09	22.71	45.78	22.81	46.54			X					
RE*AUBURN3	R18H-78A	R18H-78	42	0.013	144.50	143.70	123	0.0065	8.46	52.5	0.0021	0%		33.93		43.09		45.78		46.54	-5.95	OK	NE					
RE*AUBURN3	R18H-78	R18H-77	42	0.013	143.70	140.90	480	0.0058	8.01	49.7	0.0021	0%		33.93		43.09		45.78		46.54	-3.17	OK	NE					
RE*AUBURN3	R18H-77	R18H-76	42	0.013	140.90	138.10	480	0.0058	8.01	49.7	0.0021	0%		33.93		43.09		45.78		46.54	-3.17	OK	NE					
RE*AUBURN3	R18H-76	R18H-75	42	0.013	138.10	135.30	480	0.0058	8.01	49.7	0.0021	0%		33.93		43.09		45.78		46.54	-3.17	OK	NE					
RE*AUBURN3	R18H-75	R18H-74	42	0.013	135.30	132.60	480	0.0056	7.86	48.8	0.0021	0%		33.93		43.09		45.78		46.54	-2.27	OK	NE					
Section			42	0.013		11.90	2043	0.0058	**8.00**	**49.7**	**0.0058**	0%		33.93		43.09		45.78		46.54	-3.13	OK	NE					OK
RE*AUBURN3	R18H-74	R18H-73	72	0.013	131.40	131.00	162	0.0025	7.46	136.1	0.0021	100% aub3-c	2.99	36.93	3.96	47.05	4.23	50.01	4.35	50.89	-85.24	OK	NE	0.06	0.40	0.34	0.07	
RE*AUBURN3	R18H-73	R18H-72	72	0.013	131.00	131.10	499	-0.0002			0.0021	0%		36.93		47.05		50.01		50.89	50.89	54	2010	0.17	**-0.10**	**-0.27**	-0.27	IGNORE
RE*AUBURN3	R18H-72	R18H-71	72	0.013	131.10	130.80	500	0.0006	3.68	67.1	0.0021	0%		36.93		47.05		50.01		50.89	-16.22	OK	NE					
RE*AUBURN3	R18H-71	R18H-70	72	0.013	130.80	130.60	365	0.0005	3.52	64.1	0.0021	0%		36.93		47.05		50.01		50.89	-13.24	OK	NE	0.13	0.20	0.07	0.05	
RE*AUBURN3	R18H-70	R18H-69	72	0.013	130.60	130.50	363	0.0003	2.49	45.5	0.0021	0%		36.93		47.05		50.01		50.89	5.42	24	2020	0.12	0.10	**-0.02**	-0.02	IGNORE
RE*AUBURN3	R18H-69	R18H-68	72	0.013	130.50	130.30	84	0.0024	7.33	133.7	0.0021	0%		36.93		47.05		50.01		50.89	-82.79	OK	NE					
RE*AUBURN3	R18H-68	R18H-67	72	0.013	130.30	130.10	421	0.0005	3.27	59.7	0.0021	0%		36.93		47.05		50.01		50.89	-8.82	OK	NE					
RE*AUBURN3	R18H-67	R18H-66	72	0.013	130.10	129.80	489	0.0006	3.72	67.9	0.0021	0%		36.93		47.05		50.01		50.89	-16.97	OK	NE					
RE*AUBURN3	R18H-66	R18H-65	72	0.013	129.80	129.20	489	0.0012	5.26	96.0	0.0021	0%		36.93		47.05		50.01		50.89	-45.08	OK	NE	0.17	0.60	0.43	0.23	
												100% WVAL 79-1	14.27	51.19	18.30	65.35	19.40	69.41	19.62	70.51			X					
RE*AUBURN3	R18H-65	R18H-64	72	0.013	129.20	128.90	610	0.0005	3.33	60.8	0.0021	0%		51.19		65.35		69.41		70.51	9.76	30	2020	0.40	0.30	**-0.10**	-0.21	IGNORE
RE*AUBURN3	R18H-64	R18H-63	72	0.013	128.90	128.60	612	0.0005	3.33	60.7	0.0021	0%		51.19		65.35		69.41		70.51	9.85	30	2020	0.40	0.30	**-0.10**	-0.10	IGNORE
RE*AUBURN3	R18H-63	R18H-62	72	0.013	128.60	128.50	87	0.0011	5.09	92.9	0.0021	0%		51.19		65.35		69.41		70.51	-22.37	OK	NE					
RE*AUBURN3	R18H-62	R18H-61	72	0.013	128.50	128.30	275	0.0007	4.05	73.9	0.0021	0%		51.19		65.35		69.41		70.51	-3.37	OK	NE					
RE*AUBURN3	R18H-61	R18H-59	72	0.013	128.30	127.90	556	0.0007	4.03	73.5	0.0021	0%		51.19		65.35		69.41		70.51	-2.97	OK	NE					
RE*AUBURN3	R18H-59	R18H-58	72	0.013	127.90	127.50	460	0.0009	4.43	80.8	0.0021	0%		51.19		65.35		69.41		70.51	-10.28	OK	NE					
Section			72	0.013		3.90	5972	0.0007	**3.84**	**70.0**	**0.0007**	0%		51.19		65.35		69.41		70.51	0.50	12	2050					ok
												100% fwaub-x	0.91	52.11	1.63	66.98	1.73	71.14	1.74	72.25			X					
												100% fwaub-w	0.79	52.90	1.41	68.39	1.49	72.63	1.50	73.76			X					
RE*AUBURN3	R18H-58	R18H-57	72	0.013	127.46	127.63	82	-0.0021			0.0006	100% aub3-nw	1.75	54.65	2.31	70.70	2.45	75.08	2.47	76.22	76.22	78	2010					
RE*AUBURN3	R18H-57	R18H-56	72	0.013	127.60	127.10	582	0.0009	4.40	80.3	0.0006	0%		54.65		70.70		75.08		76.22	-4.08	OK	NE					
RE*AUBURN3	R18H-56	R18H-55	72	0.013	127.10	126.80	525	0.0006	3.59	65.5	0.0006	0%		54.65		70.70		75.08		76.22	10.73	39	2020					
RE*AUBURN3	R18H-55	R18H-54	72	0.013	126.80	126.50	513	0.0006	3.63	66.3	0.0006	0%		54.65		70.70		75.08		76.22	9.97	36	2020					
RE*AUBURN3	R18H-54	R18H-53	72	0.013	126.50	126.10	515	0.0008	4.19	76.4	0.0006	0%		54.65		70.70		75.08		76.22	-0.13	OK	NE					
RE*AUBURN3	R18H-53	R18H-52	72	0.013	126.10	125.80	578	0.0005	3.42	62.4	0.0006	0%		54.65		70.70		75.08		76.22	13.81	42	2020					
RE*AUBURN3	R18H-52	R18H-51	72	0.013	125.80	125.50	530	0.0006	3.57	65.2	0.0006	0%		54.65		70.70		75.08		76.22	11.04	39	2020					
RE*AUBURN3	R18H-51	R18H-50	72	0.013	125.50	125.00	530	0.0009	4.61	84.1	0.0006	0%		54.65		70.70		75.08		76.22	-7.93	OK	NE					
RE*AUBURN3	R18H-50	R18H-49	72	0.013	125.00	124.70	311	0.0010	4.66	85.1	0.0006	0%		54.65		70.70		75.08		76.22	-8.87	OK	NE					
RE*AUBURN3	R18H-49	R18H-48	72	0.013	124.70	124.50	1000	0.0002	2.12	38.7	0.0006	0%		54.65		70.70		75.08		76.22	37.48	60	2010					
Section			72	0.013		2.96	5166	0.0006	**3.60**	**65.6**	**0.0006**	0%		54.65		70.70		75.08		76.22	10.64	39	2020					39
TO AUBURN3.R18H-48												0%																
*RWSP pipe or section data revised.																												

APPENDIX 240-F

AUBURN PLANNING ZONE REROUTING ALTERNATIVE FLOW ROUTING

Task 240 Report: AUBURN PLANNING ZONE - REROUTING ALTERNATIV											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow Percent	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ− Δfull	BW elev	Proposed Diameter (inches)
do not delete this line																												
LAKELAND HILLS TRUNK																												
(replace gravity pipe downstream from forcemain)												100% lh-pc	1.73	1.73	3.08	3.08	3.29	3.29	3.35	3.35			X					
												100% wr-x	3.84	5.57	6.39	9.47	6.78	10.07	6.84	10.18			X					
LH TRUNK	LH#1	LH#2	27	0.013	194.49	174.91	6896	0.0028	4.16	10.7	0.0028	0%		5.57		9.47		10.07		10.18	-0.50	OK	NE					27
																							X					
TO STK-1																												
STUCK TRUNK																												
(divert from end of M St Trunk)												100% seg-x	1.26	1.26	1.94	1.94	2.05	2.05	2.06	2.06			X					
STUCK/ M ST #49	MST	LH#2	30	0.013	199.10	174.10	5000	0.0050	5.92	18.8	0.0050	70% mst-s	6.47	7.73	7.44	9.38	7.93	9.99	8.20	10.26	-8.50	OK	NE					30
												50% wi-x	5.37	13.10	5.99	15.37	6.32	16.31	6.31	16.57			X					
												100% LH TRUNK	5.57	18.67	9.47	24.84	10.07	26.38	10.18	26.75	26.75		X					
STUCK	LH#2	LH#3	42	0.013	173.10	166.95	1800	0.0034	6.13	38.1	0.0034	0%		18.67		24.84		26.38		26.75	-11.31	OK	NE					42
STUCK match ex.IE	LH#3	WINT#32	42	0.013	166.95	162.10	2851	0.0017	4.32	26.8	0.0017	0%		18.67		24.84		26.38		26.75	-0.08	OK	NE					42
STUCK match ex.inv	WINT#32	SW7	42	0.013	162.10	148.40	4500	0.0030	5.79	35.9	0.0030	0%		18.67		24.84		26.38		26.75	-9.16	OK	NE					42
	Section						**14151**	**0.0132**														OK	NE					
TO SW-7																												
26TH ST. TRUNK																												
(paralell to N Sewer. Trunk)																							X					
26th TRUNK	GR22-10	R18H-77	18	0.013	147.90	140.90	4297	0.0016	2.41	2.7	0.0008	100% mst-ne	1.13	1.13	1.72	1.72	1.84	1.84	1.89	1.89	-0.85	OK	NE					18
	Section		**18**			**140.90**	**4297**	**0.0016**		**2.7**												OK	NE					
TO RE*AUBURN3.R18H-77																												
SOUTHWEST TRUNK 1																												
(uses ALPAC & AUBWVAL pipe data)												8% al-x	0.27	0.27	0.30	0.30	0.31	0.31	0.32	0.32			X					
												100% pac-x	2.71	2.99	3.26	3.55	3.47	3.79	3.57	3.88			X					
PACIFIC FM						165.6						100% pac-a	2.58	5.56	3.23	6.78	3.43	7.22	3.45	7.34								
SW TRUNK	8	7	30	0.013	164.85	149.40	12000	0.0013	3.01	9.5	0.0013	0%		5.56		6.78		7.22		7.34	-2.19	OK	NE					
	Section		30	**0.013**		**15**	**12000**	**0.0013**	**3.01**	**9.5**	0.0013	0%		5.56		6.78		7.22		7.34	-2.19	OK	NE					30
											0.0011	100% STUCK TRUNK	18.67	24.24	24.84	31.62	26.38	33.59	26.75	34.09			X					
SW TRUNK	7	6	54	0.013	147.40	146.99	380	0.0011	4.10	42.0	0.0011	100% fwne-w	2.39	26.63	4.21	35.83	4.45	38.05	4.48	38.57	-3.46	OK	NE					
SW TRUNK	6	5	54	0.013	146.99	146.40	538	0.0011	4.10	42.0	0.0011	10% aub3-s	0.14	26.77	0.18	36.01	0.19	38.23	0.19	38.76	-3.27	OK	NE					
SW TRUNK	5	4	54	0.013	146.40	145.88	475	0.0011	4.10	42.0	0.0011	0%		26.77		36.01		38.23		38.76	-3.27	OK	NE					
SW TRUNK	4	3	54	0.013	145.88	145.36	480	0.0011	4.10	42.0	0.0011	0%		26.77		36.01		38.23		38.76	-3.27	OK	NE					
SW TRUNK	3	2	54	0.013	145.36	144.83	482	0.0011	4.10	42.0	0.0011	0%		26.77		36.01		38.23		38.76	-3.27	OK	NE					
SW TRUNK	2	1	54	0.013	144.83	144.57	235	0.0011	4.10	42.0	0.0011	0%		26.77		36.01		38.23		38.76	-3.27	OK	NE					
	Section		54	**0.013**		**2.83**	**2590**	**0.0011**	**4.10**	**42.0**	**0.0011**	0%		26.77		36.01		38.23		38.76	-3.27	OK	NE					54
												0%		26.77		36.01		38.23		38.76			X					
SW TRUNK	3	2	54	0.013	144.57	138.67	5410	0.0011	4.10	42.0	0.0035	100% fwne-x	1.71	28.48	2.12	38.12	2.24	40.48	2.26	41.02	-1.00	OK	NE					
SW TRUNK	2	1	54	0.013	138.67	132.40	5500	0.0011	4.19	43.0	0.0035	100% fwaub-w	0.79	29.27	1.41	39.53	1.49	41.97	1.50	42.52	-0.43	OK	NE					
												100% fwaub-x	0.91	30.19	1.63	41.17	1.73	43.70	1.74	44.27			X					
SW TRUNK @Aub3#48 @124.5	1	R18H-44	54	0.013	132.40	126.00	5000	0.0013	4.44	45.5	0.0035	50% aub3-nw	0.88	31.06	1.15	42.32	1.22	44.92	1.23	45.50	-0.01	OK	NE					
	Section		54	**0.013**		**18.57**	**15,910**	**0.0035**	**7.35**	**75.4**	**0.0035**			31.06		42.32		44.92		45.50	-29.88	OK	NE					54
TO RE*AUBURN3.R18H-63																												

Task 240 Report:
AUBURN PLANNING ZONE - REROUTING ALTERNATIV

Surcharge: any negative value in "BW elev"

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
do not delete this line																												
ALGONA-PACIFIC & WEST												0%											X					
RE*ALPAC FORCEMAIN	PS 2	238	12	0.013	144.50	165.60	2940					0%											X					
RE*ALPAC	238	237	21	0.013	165.60	165.30	400	0.0007	1.81	2.8	0.0012	0%									-2.81	OK	NE					
RE*ALPAC	237	230	21	0.013	165.30	164.90	401	0.0010	2.09	3.2	0.0012	0%									-3.24	OK	NE					
RE*ALPAC	230	229	21	0.013	164.90	164.70	135	0.0015	2.54	3.9	0.0012	12% al-x	**0.41**	0.41	**0.45**	0.45	**0.47**	0.47	**0.47**	0.47	-3.47	OK	NE					
RE*ALPAC	229	228	21	0.013	164.70	164.40	275	0.0011	2.18	3.4	0.0012	0%		0.41		0.45		0.47		0.47	-2.91	OK	NE					
RE*ALPAC	228	251	21	0.013	164.40	163.90	241	0.0021	3.01	4.7	0.0012	0%		0.41		0.45		0.47		0.47	-4.20	OK	NE					
RE*ALPAC	251	252	21	0.013	163.90	163.60	366	0.0008	1.89	2.9	0.0012	0%		0.41		0.45		0.47		0.47	-2.46	OK	NE					
RE*ALPAC	252	253	21	0.013	163.60	163.20	328	0.0012	2.31	3.6	0.0012	0%		0.41		0.45		0.47		0.47	-3.11	OK	NE					
RE*ALPAC	253	254	21	0.013	163.20	162.90	165	0.0018	2.81	4.4	0.0012	0%		0.41		0.45		0.47		0.47	-3.89	OK	NE					
RE*ALPAC	254	256	21	0.013	162.90	162.60	300	0.0010	2.09	3.2	0.0012	0%		0.41		0.45		0.47		0.47	-2.76	OK	NE					
	Section		21	0.013		3.00	2611	0.0011		**3.5**	**0.0011**	0%		0.41		0.45		0.47		0.47	-3.00	OK	NE					OK
RE*ALPAC	256	257	24	0.013	162.60	162.50	89	0.0011	2.42	4.9	0.0012	40% al-x	**1.37**	1.78	**1.49**	1.94	**1.57**	2.04	**1.58**	2.06	-2.85	OK	NE					
RE*ALPAC	257	258	24	0.013	162.50	162.20	251	0.0012	2.50	5.1	0.0012	0%		1.78		1.94		2.04		2.06	-3.00	OK	NE					
RE*ALPAC	258	259	24	0.013	162.20	161.90	248	0.0012	2.51	5.1	0.0012	0%		1.78		1.94		2.04		2.06	-3.03	OK	NE					
RE*ALPAC	259	260	24	0.013	161.90	161.70	241	0.0008	2.08	4.2	0.0012	0%		1.78		1.94		2.04		2.06	-2.16	OK	NE					
RE*ALPAC	260	261	24	0.013	161.70	161.40	241	0.0012	2.55	5.2	0.0012	0%		1.78		1.94		2.04		2.06	-3.10	OK	NE					
RE*ALPAC	261	290	24	0.013	161.40	161.20	185	0.0011	2.37	4.8	0.0012	0%		1.78		1.94		2.04		2.06	-2.76	OK	NE					
RE*ALPAC	290	293	24	0.013	161.20	160.80	421	0.0010	2.22	4.5	0.0012	0%		1.78		1.94		2.04		2.06	-2.45	OK	NE					
RE*ALPAC	293	304	24	0.013	160.80	160.30	438	0.0011	2.44	4.9	0.0012	0%		1.78		1.94		2.04		2.06	-2.88	OK	NE					
RE*ALPAC	304	305	24	0.013	160.30	159.90	460	0.0009	2.13	4.3	0.0012	0%		1.78		1.94		2.04		2.06	-2.26	OK	NE					
RE*ALPAC	305	306	24	0.013	159.90	159.40	440	0.0011	2.44	4.9	0.0012	0%		1.78		1.94		2.04		2.06	-2.88	OK	NE					
RE*ALPAC	306	307	24	0.013	159.40	159.00	446	0.0009	2.16	4.4	0.0012	0%		1.78		1.94		2.04		2.06	-2.32	OK	NE					
RE*ALPAC	307	308	24	0.013	159.00	158.60	434	0.0009	2.19	4.4	0.0012	0%		1.78		1.94		2.04		2.06	-2.39	OK	NE					
RE*ALPAC	308	309	24	0.013	158.60	158.10	441	0.0011	2.43	4.9	0.0012	0%		1.78		1.94		2.04		2.06	-2.87	OK	NE					
RE*ALPAC	309	309B	24	0.013	158.10	157.80	340	0.0009	2.15	4.3	0.0012	0%		1.78		1.94		2.04		2.06	-2.29	OK	NE					
RE*ALPAC	309B	R83-17	24	0.013	157.80	157.20	345	0.0017	3.01	6.1	0.0012	40% al-x	**1.37**	3.15	**1.49**	3.42	**1.57**	3.61	**1.58**	3.64	-2.46	OK	NE					
	Section		24	0.013		5.40	5020	0.0011		**4.8**	**0.0011**	0%		3.15		3.42		3.61		3.64	-1.16	OK	NE					OK
RE*AUBWVAL	R83-17	R83-16	24	0.013	157.20	156.40	437	0.0018	3.09	6.3	0.0012	0%		3.15		3.42		3.61		3.64	-2.63	OK	NE					
RE*AUBWVAL	R83-16	R83-15	24	0.013	156.40	156.00	39	0.0103	7.31	14.8	0.0012	0%		3.15		3.42		3.61		3.64	-11.18	OK	NE					
RE*AUBWVAL	R83-15	R83-14	24	0.013	156.00	154.80	367	0.0033	4.13	8.4	0.0012	0%		3.15		3.42		3.61		3.64	-4.73	OK	NE					
RE*AUBWVAL	R83-14	R83-13	24	0.013	154.80	154.00	369	0.0022	3.36	6.8	0.0012	0%		3.15		3.42		3.61		3.64	-3.17	OK	NE					
RE*AUBWVAL	R83-13	R83-12	24	0.013	154.00	153.60	408	0.0010	2.26	4.6	0.0012	0%		3.15		3.42		3.61		3.64	-0.94	OK	NE					
RE*AUBWVAL	R83-12	R83-11	24	0.013	153.60	153.30	371	0.0008	2.05	4.2	0.0012	0%		3.15		3.42		3.61		3.64	-0.52	OK	NE	0.23	0.30	0.07	0.00	
RE*AUBWVAL	R83-11	R83-10	24	0.013	153.30	153.10	339	0.0006	1.75	3.6	0.0012	0%		3.15		3.42		3.61		3.64	0.08	6	2030	0.21	0.20	**-0.01**	-0.08	ignore
RE*AUBWVAL	R83-10	R83-09	24	0.013	153.10	153.00	270	0.0004	1.39	2.8	0.0012	0%		3.15		3.42		3.61		3.64	0.82	15	2010	0.17	0.10	**-0.07**	-0.07	ignore
RE*AUBWVAL	R83-09	R83-08	24	0.013	153.00	152.50	221	0.0023	3.43	7.0	0.0012	0%		3.15		3.42		3.61		3.64	-3.32	OK	NE					
RE*AUBWVAL	R83-08	R83-07	24	0.013	152.50	152.10	467	0.0009	2.11	4.3	0.0012	0%		3.15		3.42		3.61		3.64	-0.64	OK	NE					
RE*AUBWVAL	R83-07	R83-06	24	0.013	152.10	151.80	380	0.0008	2.03	4.1	0.0012	0%		3.15		3.42		3.61		3.64	-0.47	OK	NE					
RE*AUBWVAL	R83-06	R83-05	24	0.013	151.80	151.20	538	0.0011	2.41	4.9	0.0012	0%		3.15		3.42		3.61		3.64	-1.25	OK	NE					
RE*AUBWVAL	R83-05	R83-04	24	0.013	151.20	150.80	475	0.0008	2.09	4.2	0.0012	0%		3.15		3.42		3.61		3.64	-0.61	OK	NE					
RE*AUBWVAL	R83-04	R83-03	24	0.013	150.80	150.20	480	0.0013	2.55	5.2	0.0012	0%		3.15		3.42		3.61		3.64	-1.53	OK	NE					
RE*AUBWVAL	R83-03	R83-02	24	0.013	150.20	149.80	482	0.0008	2.08	4.2	0.0012	0%		3.15		3.42		3.61		3.64	-0.57	OK	NE					
RE*AUBWVAL	R83-02	R83-01	24	0.013	149.80	149.20	235	0.0026	3.65	7.4	0.0012	0%		3.15		3.42		3.61		3.64	-3.75	OK	NE					
	Section		24	0.013		8.00	5878	0.0014	**2.66**	**5.4**	**0.0014**	0%		3.15		3.42		3.61		3.64	-1.76	OK	NE					OK

Task 240 Report:
AUBURN PLANNING ZONE - REROUTING ALTERNATIV

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
												0%		3.15		3.42		3.61		3.64			X					
WVAL	R83-01	81-2	36	0.013	149.15	148.95	375	0.0005	2.18	10.0	0.0038	10% aub3-s	**0.14**	3.30	**0.18**	3.60	**0.19**	3.80	**0.19**	3.83	-6.13	OK	NE					
WVAL	81-2	81-1	30	0.013	149.00	148.50	210	0.0024	4.09	12.9	0.0038	0%		3.30		3.60		3.80		3.83	-9.12	OK	NE					
WVAL	81-1	80-8	42	0.013	148.50	148.42	70	0.0011	3.54	22.0	0.0038	0%		3.30		3.60		3.80		3.83	-18.17	OK	NE					
WVAL Main St*	80-8	80-7	42	0.013	148.42	147.60	335	0.0024	5.19	32.2	0.0038	0%		3.30		3.60		3.80		3.83	-28.37	OK	NE					
WVAL	80-7	80-6	30	0.013	147.60	147.00	167	0.0036	5.02	15.9	0.0038	0%		3.30		3.60		3.80		3.83	-12.07	OK	NE					
WVAL	80-6	80-5	30	0.013	147.00	146.10	482	0.0019	3.62	11.5	0.0038	30% aub3-s	**0.43**	3.73	**0.53**	4.13	**0.56**	4.36	**0.57**	4.40	-7.06	OK	NE					
WVAL	80-5	80-3	30	0.013	146.10	145.16	510	0.0018	3.60	11.4	0.0038	0%		3.73		4.13		4.36		4.40	-6.99	OK	NE					
WVAL	80-3	80-2	30	0.013	145.16	144.50	441	0.0015	3.24	10.3	0.0038	0%		3.73		4.13		4.36		4.40	-5.86	OK	NE					
WVAL	80-2	80-1	30	0.013	144.50	143.70	450	0.0018	3.53	11.2	0.0038	0%		3.73		4.13		4.36		4.40	-6.79	OK	NE					
WVAL	80-1	79-23	30	0.013	143.70	142.80	447	0.0020	3.76	11.9	0.0038	0%		3.73		4.13		4.36		4.40	-7.50	OK	NE					
WVAL	79-23	79-22	30	0.013	142.80	142.25	465	0.0012	2.88	9.1	0.0038	0%		3.73		4.13		4.36		4.40	-4.72	OK	NE					
WVAL	79-22	79-21	30	0.013	142.25	141.95	450.4	0.0007	2.16	6.8	0.0038	0%		3.73		4.13		4.36		4.40	-2.45	OK	NE					
WVAL	79-21	79-20	30	0.013	141.95	141.70	409.5	0.0006	2.07	6.6	0.0038	0%		3.73		4.13		4.36		4.40	-2.15	OK	NE					
WVAL	79-20	79-19	30	0.013	141.70	141.48	363	0.0006	2.06	6.5	0.0038	0%		3.73		4.13		4.36		4.40	-2.13	OK	NE					
WVAL	79-19	79-18	30	0.013	141.48	141.26	361.5	0.0006	2.07	6.5	0.0038	0%		3.73		4.13		4.36		4.40	-2.15	OK	NE					
WVAL	79-18	79-17	30	0.013	141.26	141.00	425	0.0006	2.07	6.6	0.0038	0%		3.73		4.13		4.36		4.40	-2.16	OK	NE					
WVAL	79-17	79-16	42	0.013	140.89	139.87	260	0.0039	6.57	40.8	0.0038	0%		3.73		4.13		4.36		4.40	-36.37	OK	NE					
WVAL	79-16	79-15X	30	0.013	139.87	139.67	360	0.0006	1.97	6.3	0.0038	0%		3.73		4.13		4.36		4.40	-1.85	OK	NE					
WVAL	79-15X	79-15	30	0.013	139.67	139.04	90	0.0070	7.01	22.2	0.0038	0%		3.73		4.13		4.36		4.40	-17.80	OK	NE					
WVAL	79-15	79-14	30	0.013	139.04	138.15	410	0.0022	3.90	12.4	0.0038	0%		3.73		4.13		4.36		4.40	-7.96	OK	NE					
WVAL	79-14	1	30	0.013	138.15	137.92	388.5	0.0006	2.04	6.5	0.0038	0%		3.73		4.13		4.36		4.40	-2.06	OK	NE					
	Section		24	0.013		11.23	7469.9	0.0015	**2.80**	**5.7**	0.0015	0%		3.73		4.13		4.36		4.40	-1.28	OK	NE					OK
WVAL	1	79-13	42	0.013	137.92	136.50	380	0.0037	6.41	39.8	0.0038	0%		3.73		4.13		4.36		4.40	-35.39	OK	NE					
WVAL	79-13	79-12	30	0.013	136.50	136.40	99.7	0.0010	2.65	8.4	0.0038	0%		3.73		4.13		4.36		4.40	-4.01	OK	NE					
											0.0038	0%		3.73		4.13		4.36		4.40			X					
WVAL	79-12	79-11	30	0.013	136.40	135.95	483.7	0.0009	2.55	8.1	0.0038	25% aub3-s	**0.36**	4.09	**0.44**	4.57	**0.47**	4.83	**0.48**	4.88	-3.21	OK	NE					
WVAL	79-11	79-10	30	0.013	135.95	135.70	289.2	0.0009	2.46	7.8	0.0038	0%		4.09		4.57		4.83		4.88	-2.92	OK	NE					
WVAL	79-10	79-9	30	0.013	135.70	135.41	364	0.0008	2.37	7.5	0.0038	0%		4.09		4.57		4.83		4.88	-2.61	OK	NE					
WVAL	79-9	79-8	30	0.013	135.41	135.12	361	0.0008	2.38	7.5	0.0038	0%		4.09		4.57		4.83		4.88	-2.65	OK	NE					
WVAL	79-8	79-6	30	0.013	135.12	134.83	362	0.0008	2.37	7.5	0.0038	0%		4.09		4.57		4.83		4.88	-2.63	OK	NE					
WVAL	79-6	79-5	30	0.013	134.83	134.50	411	0.0008	2.37	7.5	0.0038	0%		4.09		4.57		4.83		4.88	-2.64	OK	NE					
WVAL	79-5	79-4	30	0.013	134.50	134.09	496.3	0.0008	2.41	7.6	0.0038	0%		4.09		4.57		4.83		4.88	-2.75	OK	NE					
WVAL	79-4	79-3	30	0.013	134.09	133.70	490	0.0008	2.36	7.5	0.0038	0%		4.09		4.57		4.83		4.88	-2.61	OK	NE					
WVAL	79-3	79-2	30	0.013	133.70	133.42	372.7	0.0008	2.30	7.3	0.0038	25% aub3-s	**0.36**	4.46	**0.44**	5.01	**0.47**	5.30	**0.48**	5.35	-1.92	OK	NE					
WVAL	79-2	79-1	30	0.013	133.42	133.40	38.5	0.0005	1.91	6.0	0.0038	0%		4.46		5.01		5.30		5.35	-0.69	OK	NE					
WVAL	79-1	R18H-65	42	0.013	133.40	133.19	12	0.0175	13.87	86.1	0.0038	0%		4.46		5.01		5.30		5.35	-80.75	OK	NE					
	Section		30	0.013		4.73	4160.1	0.0011	**2.83**	**8.9**	0.0011	0%		4.46		5.01		5.30		5.35	-3.60	OK	NE					OK
TO AUBURN3.R18H-65																												

Task 240 Report:
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FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
WEST INTERCEPTOR												0%											X					
L. HILLS*			24	0.013	194.74	174.98	7269	0.0017	3.01	6.1	0.0027	0%									-6.10	OK	NE					
REPLACEMENT REQUIRED			27	0.013		19.76	7269	0.0027	**4.07**	**10.4**	**0.0027**	0%									-10.45	OK	NE					
RE*WINTSEWR	GR27-44	GR27-43	24	0.013	174.98	172.67	329	0.0070	6.05	12.3	0.0236	0%									-12.26	OK	NE					
RE*WINTSEWR	GR27-43	GR27-42	24	0.013	172.67	170.67	295.3	0.0068	5.94	12.0	0.0236	0%									-12.05	OK	NE					
RE*WINTSEWR	GR27-42	GR27-41	24	0.013	170.67	168.78	268	0.0071	6.06	12.3	0.0236	0%									-12.29	OK	NE					
RE*WINTSEWR	GR27-41	GR27-40	24	0.013	168.78	168.52	123	0.0021	3.32	6.7	0.0236	0%									-6.73	OK	NE					
RE*WINTSEWR	GR27-40	GR27-39	24	0.013	168.52	167.20	411.7	0.0032	4.09	8.3	0.0236	0%									-8.28	OK	NE					
RE*WINTSEWR	GR27-39	GR27-38	24	0.013	167.20	166.40	399	0.0020	3.23	6.6	0.0236	0%									-6.55	OK	NE					
RE*WINTSEWR	GR27-38	GR27-37	24	0.013	166.40	165.60	410	0.0020	3.19	6.5	0.0236	0%									-6.46	OK	NE					
RE*WINTSEWR	GR27-37	GR27-36	24	0.013	165.60	164.80	411	0.0019	3.19	6.5	0.0236	0%									-6.46	OK	NE					
RE*WINTSEWR	GR27-36	GR27-35	24	0.013	164.80	163.90	410	0.0022	3.38	6.9	0.0236	0%									-6.86	OK	NE					
RE*WINTSEWR	GR27-35	GR27-34	24	0.013	163.90	163.10	419	0.0019	3.15	6.4	0.0236	0%									-6.39	OK	NE					
RE*WINTSEWR	GR27-34	GR27-33	24	0.013	163.10	162.50	414	0.0014	2.75	5.6	0.0236	0%									-5.57	OK	NE					
RE*WINTSEWR	GR27-33	GR27-32A	24	0.013	162.50	162.40	117	0.0009	2.11	4.3	0.0236	0%									-4.28	OK	NE					
RE*WINTSEWR	GR27-32A	GR27-32	24	0.013	162.40	162.10	160	0.0019	3.13	6.3	0.0236	0%									-6.34	OK	NE					
RE*WINTSEWR	GR27-32	GR27-31	24	0.013	162.10	162.00	111	0.0009	2.17	4.4	0.0236	45% wi-x	**4.83**	4.83	**5.39**	5.39	**5.69**	5.69	**5.68**	5.68	1.29	9	2010					
CORRODED UPSTREAM			24	0.013		12.98	4278	0.0030	**3.98**	**8.1**	**0.0030**	0%		4.83		5.39		5.69		5.68	-2.38	OK	NE					LH GRAVITY
RE*WINTSEWR	GR27-31	GR27-30	24	0.013	162.00	161.50	239	0.0021	3.30	6.7	0.0236	0%		4.83		5.39		5.69		5.68	-1.01	OK	NE	0.36	0.50	0.14	0.12	
RE*WINTSEWR	GR27-30	GR27-29	24	0.013	161.50	161.40	64	0.0016	2.86	5.8	0.0236	0%		4.83		5.39		5.69		5.68	-0.10	OK	NE	0.10	0.10	0.00	-0.02	
RE*WINTSEWR	GR27-29	GR27-28	24	0.013	161.40	160.80	409	0.0015	2.77	5.6	0.0236	0%		4.83		5.39		5.69		5.68	0.08	3	2030	0.61	0.60	**-0.01**	-0.03	ignore
RE*WINTSEWR	GR27-28	GR27-27	24	0.013	160.80	160.20	410	0.0015	2.76	5.6	0.0236	0%		4.83		5.39		5.69		5.68	0.08	3	2030	0.62	0.60	**-0.02**	-0.01	ignore
RE*WINTSEWR	GR27-27	GR27-26	24	0.013	160.20	159.60	398	0.0015	2.80	5.7	0.0236	0%		4.83		5.39		5.69		5.68	0.00	OK	2030	0.60	0.60	0.00	0.00	ignore
RE*WINTSEWR	GR27-26	GR27-25	24	0.013	159.60	158.20	248	0.0056	5.42	11.0	0.0236	0%		4.83		5.39		5.69		5.68	-5.31	OK	NE					
Section			24	0.013		3.80	1768	0.0021	**3.35**	**6.8**	**0.0021**	0%		4.83		5.39		5.69		5.68	-1.10	OK	NE					OK
RE*WINTSEWR	GR27-25	GR27-24	36	0.013	158.20	157.60	433	0.0014	3.52	16.1	0.0236	0%		4.83		5.39		5.69		5.68	-10.38	OK	NE					
RE*WINTSEWR	GR27-24	GR27-23	36	0.013	157.60	157.00	445	0.0013	3.47	15.8	0.0236	0%		4.83		5.39		5.69		5.68	-10.16	OK	NE					
RE*WINTSEWR	GR27-23	GR27-22	36	0.013	157.00	156.50	445	0.0011	3.17	14.5	0.0236	0%		4.83		5.39		5.69		5.68	-8.78	OK	NE					
RE*WINTSEWR	GR27-22	GR27-21	36	0.013	156.50	155.90	443	0.0014	3.48	15.9	0.0236	0%		4.83		5.39		5.69		5.68	-10.19	OK	NE					
RE*WINTSEWR	GR27-21	GR27-20	36	0.013	155.90	155.50	310	0.0013	3.40	15.5	0.0236	0%		4.83		5.39		5.69		5.68	-9.81	OK	NE					
RE*WINTSEWR	GR27-20	GR27-19	36	0.013	155.50	154.90	421	0.0014	3.57	16.3	0.0236	0%		4.83		5.39		5.69		5.68	-10.61	OK	NE					
RE*WINTSEWR	GR27-19	GR27-18	36	0.013	154.90	154.20	444	0.0016	3.76	17.1	0.0236	0%		4.83		5.39		5.69		5.68	-11.45	OK	NE					
RE*WINTSEWR	GR27-18	GR27-17	36	0.013	154.20	153.10	498	0.0022	4.45	20.3	0.0236	0%		4.83		5.39		5.69		5.68	-14.59	OK	NE					
RE*WINTSEWR*	GR27-17	GR27-16	36	0.013	153.10	153.00	490	0.0002	1.35	6.2	0.0236	0%		4.83		5.39		5.69		5.68	-0.48	OK	NE					
RE*WINTSEWR	GR27-16	GR27-15	36	0.013	153.00	152.40	499	0.0012	3.28	15.0	0.0236	0%		4.83		5.39		5.69		5.68	-9.28	OK	NE					
RE*WINTSEWR	GR27-15	GR27-14	36	0.013	152.40	151.80	488	0.0012	3.32	15.1	0.0236	0%		4.83		5.39		5.69		5.68	-9.45	OK	NE					
Section			36	0.013		6.40	4916	0.0013	**3.41**	**15.6**	**0.0013**	0%		4.83		5.39		5.69		5.68	-9.89	OK	NE					OK
RE*WINTSEWR	GR27-14	GR27-13	42	0.013	151.80	151.20	543	0.0011	3.49	21.6	0.0236	0%		4.83		5.39		5.69		5.68	-15.95	OK	NE					
RE*WINTSEWR	GR27-13	GR27-12B	42	0.013	151.20	150.90	110	0.0027	5.48	34.0	0.0236	0%		4.83		5.39		5.69		5.68	-28.30	OK	NE					
RE*WINTSEWR	GR27-12B	GR27-12	42	0.013	150.90	150.80	250	0.0004	2.10	13.0	0.0236	0%		4.83		5.39		5.69		5.68	-7.34	OK	NE					
RE*WINTSEWR	GR27-12	GR27-11	42	0.013	150.80	150.40	309	0.0013	3.77	23.4	0.0236	0%		4.83		5.39		5.69		5.68	-17.74	OK	NE					
RE*WINTSEWR	GR27-11	GR27-10	42	0.013	150.40	150.00	428	0.0009	3.21	19.9	0.0236	0%		4.83		5.39		5.69		5.68	-14.21	OK	NE					
RE*WINTSEWR	GR27-10	GR27-09	42	0.013	150.00	149.80	206	0.0010	3.27	20.3	0.0236	0%		4.83		5.39		5.69		5.68	-14.59	OK	NE					
Section			42	0.013		2.00	1846	0.0011	3.45	21.4		0%		4.83		5.39		5.69		5.68	-15.74	OK	NE					
RE*WINTSEWR	GR27-09	GR27-08	42	0.013	149.80	149.10	503	0.0014	3.91	24.3	0.0236	0%		4.83		5.39		5.69		5.68	-18.59	OK	NE					
RE*WINTSEWR	GR27-08	GR27-07	42	0.013	149.10	148.50	499	0.0012	3.64	22.6	0.0236	0%		4.83		5.39		5.69		5.68	-16.89	OK	NE					
RE*WINTSEWR	GR27-07	GR27-06	42	0.013	148.50	147.80	479	0.0015	4.01	24.9	0.0236	0%		4.83		5.39		5.69		5.68	-19.19	OK	NE					
RE*WINTSEWR	GR27-06	GR27-05	42	0.013	147.80	147.30	426	0.0012	3.59	22.3	0.0236	0%		4.83		5.39		5.69		5.68	-16.61	OK	NE					
RE*WINTSEWR	GR27-05	GR27-04	42	0.013	147.30	146.80	398	0.0013	3.72	23.1	0.0236	0%		4.83		5.39		5.69		5.68	-17.39	OK	NE					
RE*WINTSEWR	GR27-04	GR27-03	42	0.013	146.80	146.60	121	0.0017	4.26	26.5	0.0236	0%		4.83		5.39		5.69		5.68	-20.78	OK	NE					
RE*WINTSEWR	GR27-03	GR27-02	42	0.013	146.60	145.70	636	0.0014	3.94	24.5	0.0236	0%		4.83		5.39		5.69		5.68	-18.80	OK	NE					
RE*WINTSEWR	GR27-02	GR27-01	42	0.013	145.70	144.80	628	0.0014	3.97	24.6	0.0236	5% wi-x	**0.54**	5.37	**0.60**	5.99	**0.63**	6.32	**0.63**	6.31	-18.32	OK	NE					
RE*WINTSEWR	GR27-01	R18H-78A	42	0.013	144.80	144.50	65	0.0046	7.12	44.2	0.0236	0%		5.37		5.99		6.32		6.31	-37.90	OK	NE					
Section			42	0.013		5.30	3755	0.0014	**3.94**	**24.5**	**0.0014**	0%		5.37		5.99		6.32		6.31	-18.14	OK	NE					OK
TO AUBURN3.R18H-78A																												

Task 240 Report:
AUBURN PLANNING ZONE - REROUTING ALTERNATIV

Surcharge: any negative value in "BW elev"

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
M STREET TRUN																						OK	NE					
RE*MSTTRUNK	GR19-49	GR19-48	18	0.013	200.10	199.10	422	0.0024	2.90	3.3	0.0036	0%									-3.31	OK	NE					
RE*MSTTRUNK	GR19-48	GR19-47	18	0.013	199.10	198.30	385	0.0021	2.72	3.1	0.0036	0%									-3.10	OK	NE					
RE*MSTTRUNK	GR19-47	GR19-46	18	0.013	198.30	198.05	102	0.0025	2.95	3.4	0.0036	0%									-3.36	OK	NE					
RE*MSTTRUNK	GR19-46	GR19-45	18	0.013	198.05	197.10	414	0.0023	2.86	3.3	0.0036	0%									-3.26	OK	NE					
RE*MSTTRUNK	GR19-45	GR19-44	18	0.013	197.10	196.40	322	0.0022	2.78	3.2	0.0036	0%									-3.17	OK	NE					
RE*MSTTRUNK	GR19-44	GR20-43	18	0.013	196.40	195.60	330	0.0024	2.94	3.3	0.0036	7% mst-s	**0.65**	0.65	**0.74**	0.74	**0.79**	0.79	**0.82**	0.82	-2.53	OK	NE					
Section			18	0.013		4.50	1975	0.0023	**2.85**	**3.2**	**0.0023**	0%		0.65		0.74		0.79		0.82	-2.43	OK	NE					OK
RE*MSTTRUNK	GR20-43	GR20-42	18	0.013	195.60	194.00	308	0.0052	4.30	4.9	0.0036	0%		0.65		0.74		0.79		0.82	-4.08	OK	NE					
RE*MSTTRUNK	GR20-42	GR20-41	18	0.013	194.00	192.40	320	0.0050	4.22	4.8	0.0036	0%		0.65		0.74		0.79		0.82	-3.99	OK	NE					
RE*MSTTRUNK	GR20-41	GR20-40	18	0.013	192.40	190.80	321	0.0050	4.21	4.8	0.0036	0%		0.65		0.74		0.79		0.82	-3.98	OK	NE					
RE*MSTTRUNK	GR20-40	GR21-39	18	0.013	190.80	188.90	362	0.0052	4.32	4.9	0.0036	0%		0.65		0.74		0.79		0.82	-4.10	OK	NE					
RE*MSTTRUNK	GR21-39	GR21-38	18	0.013	188.90	187.30	329	0.0049	4.16	4.7	0.0036	0%		0.65		0.74		0.79		0.82	-3.92	OK	NE					
RE*MSTTRUNK	GR21-38	GR21-37	18	0.013	187.30	185.60	340	0.0050	4.22	4.8	0.0036	8% mst-s	**0.74**	1.39	**0.85**	1.59	**0.91**	1.70	**0.94**	1.76	-3.05	OK	NE					
RE*MSTTRUNK	GR21-37	GR21-36A	18	0.013	185.60	185.20	77	0.0052	4.30	4.9	0.0036	0%		1.39		1.59		1.70		1.76	-3.14	OK	NE					
RE*MSTTRUNK	GR21-36A	GR21-36	18	0.013	185.20	183.90	252	0.0052	4.28	4.9	0.0036	0%		1.39		1.59		1.70		1.76	-3.12	OK	NE					
RE*MSTTRUNK	GR21-36	GR21-35	18	0.013	183.90	180.20	285	0.0130	6.79	7.7	0.0036	0%		1.39		1.59		1.70		1.76	-5.99	OK	NE					
RE*MSTTRUNK	GR21-35	GR21-34	18	0.013	180.20	178.40	342	0.0053	4.32	4.9	0.0036	0%		1.39		1.59		1.70		1.76	-3.17	OK	NE					
RE*MSTTRUNK	GR21-34	GR21-33	18	0.013	178.40	176.20	428	0.0051	4.27	4.9	0.0036	0%		1.39		1.59		1.70		1.76	-3.11	OK	NE					
RE*MSTTRUNK	GR21-33	GR21-32	18	0.013	176.20	174.10	430	0.0049	4.16	4.7	0.0036	0%		1.39		1.59		1.70		1.76	-2.99	OK	NE					
RE*MSTTRUNK	GR21-32	GR21-31	18	0.013	174.10	172.10	383	0.0052	4.31	4.9	0.0036	15% mst-s	**1.39**	2.77	**1.59**	3.19	**1.70**	3.40	**1.76**	3.51	-1.40	OK	NE					
RE*MSTTRUNK	GR21-31	GR22-30	18	0.013	172.10	170.20	382	0.0050	4.20	4.8	0.0036	0%		2.77		3.19		3.40		3.51	-1.28	OK	NE					
Section			18	0.013		25.40	4559	0.0056	**4.45**	**5.1**	**0.0056**	0%		2.77		3.19		3.40		3.51	-1.56	OK	NE					OK
RE*MSTTRUNK	GR22-30	GR22-29	24	0.013	163.70	163.40	177	0.0017	2.97	6.0	0.0036	0%		2.77		3.19		3.40		3.51	-2.51	OK	NE					
RE*MSTTRUNK	GR22-29	GR22-28	24	0.013	163.40	163.10	165	0.0018	3.08	6.2	0.0036	0%		2.77		3.19		3.40		3.51	-2.73	OK	NE					
RE*MSTTRUNK	GR22-28	GR22-27	24	0.013	163.10	162.80	167	0.0018	3.06	6.2	0.0036	0%		2.77		3.19		3.40		3.51	-2.69	OK	NE					
RE*MSTTRUNK	GR22-27	GR22-26	24	0.013	162.80	162.50	160	0.0019	3.13	6.3	0.0036	0%		2.77		3.19		3.40		3.51	-2.82	OK	NE					
RE*MSTTRUNK	GR22-26	GR22-25	24	0.013	162.50	162.30	153	0.0013	2.61	5.3	0.0036	0%		2.77		3.19		3.40		3.51	-1.78	OK	NE					
RE*MSTTRUNK	GR22-25	GR22-24	24	0.013	162.30	162.00	128	0.0023	3.50	7.1	0.0036	0%		2.77		3.19		3.40		3.51	-3.57	OK	NE					
Section			24	0.013		1.70	950	0.0018	**3.06**	**6.2**	**0.0018**	0%		2.77		3.19		3.40		3.51	-2.68	OK	NE					OK
RE*MSTTRUNK	GR22-24	GR22-23	30	0.013	162.00	161.70	659	0.0005	1.79	5.7	0.0036	0%		2.77		3.19		3.40		3.51	-2.15	OK	NE					
RE*MSTTRUNK	GR22-23	GR22-22B	30	0.013	161.70	161.30	605	0.0007	2.16	6.8	0.0036	0%		2.77		3.19		3.40		3.51	-3.31	OK	NE					
RE*MSTTRUNK	GR22-22B	GR22-22A	30	0.013	161.30	161.10	302	0.0007	2.16	6.8	0.0036	0%		2.77		3.19		3.40		3.51	-3.31	OK	NE					
RE*MSTTRUNK	GR22-22A	GR22-22	30	0.013	161.11	160.42	203	0.0034	4.87	15.4	0.0036	0%		2.77		3.19		3.40		3.51	-11.93	OK	NE					
RE*MSTTRUNK	GR22-22	GR22-21A	30	0.013	160.42	159.79	188	0.0034	4.87	15.4	0.0036	0%		2.77		3.19		3.40		3.51	-11.93	OK	NE					
RE*MSTTRUNK	GR22-21A	GR22-21	30	0.013	159.79	159.64	20	0.0073	7.18	22.7	0.0036	100% mst-e	**3.24**	6.02	**3.98**	7.17	**4.23**	7.63	**4.30**	7.81	-14.92	OK	NE					
RE*MSTTRUNK	GR22-21	GR22-20	30	0.013	159.60	158.90	357	0.0020	3.71	11.7	0.0036	0%		6.02		7.17		7.63		7.81	-3.94	OK	NE					
RE*MSTTRUNK	GR22-20	GR22-19	30	0.013	158.80	158.00	400	0.0020	3.75	11.9	0.0036	0%		6.02		7.17		7.63		7.81	-4.05	OK	NE					
RE*MSTTRUNK	GR22-19	GR22-18	30	0.013	157.90	156.90	487	0.0021	3.80	12.0	0.0036	0%		6.02		7.17		7.63		7.81	-4.21	OK	NE					
RE*MSTTRUNK	GR22-18	GR22-17A	30	0.013	156.90	156.10	336	0.0024	4.09	12.9	0.0036	80% mst-n	**1.42**	7.44	**1.61**	8.78	**1.73**	9.36	**1.83**	9.64	-3.31	OK	NE					
RE*MSTTRUNK	GR22-17A	GR22-17	30	0.013	156.10	155.60	240	0.0021	3.82	12.1	0.0036	0%		7.44		8.78		9.36		9.64	-2.47	OK	NE					
RE*MSTTRUNK	GR22-17	GR22-16	30	0.013	155.60	155.40	59	0.0034	4.88	15.5	0.0036	0%		7.44		8.78		9.36		9.64	-5.81	OK	NE					
RE*MSTTRUNK	GR22-16	GR22-15	30	0.013	155.40	153.90	729	0.0021	3.80	12.0	0.0036	0%		7.44		8.78		9.36		9.64	-2.40	OK	NE					
RE*MSTTRUNK	GR22-15	GR22-14	30	0.013	153.90	153.80	13	0.0077	7.35	23.3	0.0036	0%		7.44		8.78		9.36		9.64	-13.63	OK	NE					
RE*MSTTRUNK	GR22-14	GR22-13A	30	0.013	153.80	152.50	687	0.0019	3.64	11.5	0.0036	0%		7.44		8.78		9.36		9.64	-1.90	OK	NE					
RE*MSTTRUNK	GR22-13A	GR22-13	30	0.013	152.50	151.80	236	0.0030	4.56	14.5	0.0036	0%		7.44		8.78		9.36		9.64	-4.81	OK	NE					
RE*MSTTRUNK	GR22-13	GR22-12A	30	0.013	151.80	151.50	134	0.0022	3.96	12.6	0.0036	0%		7.44		8.78		9.36		9.64	-2.91	OK	NE					
RE*MSTTRUNK	GR22-12A	GR22-12	30	0.013	151.50	150.30	518	0.0023	4.03	12.8	0.0036	0%		7.44		8.78		9.36		9.64	-3.13	OK	NE					
RE*MSTTRUNK	GR22-12	GR22-11	30	0.013	150.30	148.30	652	0.0031	4.64	14.7	0.0036	0%		7.44		8.78		9.36		9.64	-5.05	OK	NE					
Section			30	0.013		13.70	6825	0.0020	**3.75**	**11.9**	**0.0020**	0%		7.44		8.78		9.36		9.64	-2.25	OK	NE					OK
RE*MSTTRUNK	GR22-11	GR22-10	36	0.013	148.30	147.90	704	0.0006	2.26	10.3	0.0008	0%		7.44		8.78		9.36		9.64	-0.64	OK	NE					
												20% mst-n	**0.36**	7.79	**0.40**	9.18	**0.43**	9.79	**0.46**	10.10			X					
RE*MSTTRUNK	GR22-10	GR22-08A	36	0.013	147.90	147.00	1079	0.0008	2.73	12.5	0.0008	100% sss-sw	**0.97**	8.76	**1.36**	10.54	**1.45**	11.24	**1.48**	11.58	-0.88	OK	NE					
RE*MSTTRUNK	GR22-08A	GR22-07	36	0.013	147.00	146.60	528	0.0008	2.60	11.9	0.0008	0%		8.76		10.54		11.24		11.58	-0.29	OK	NE					
RE*MSTTRUNK	GR22-07	GR22-06	36	0.013	146.60	146.40	237	0.0008	2.75	12.5	0.0008	0%		8.76		10.54		11.24		11.58	-0.95	OK	NE					
RE*MSTTRUNK	GR22-06	GR22-05	36	0.013	146.40	146.30	13	0.0077	8.30	37.8	0.0008	0%		8.76		10.54		11.24		11.58	-26.26	OK	NE					
RE*MSTTRUNK	GR22-05	GR22-04	36	0.013	146.30	146.10	269	0.0007	2.58	11.8	0.0008	0%		8.76		10.54		11.24		11.58	-0.18	OK	NE					
RE*MSTTRUNK	GR22-04	GR22-02A	36	0.013	146.10	145.60	655	0.0008	2.61	11.9	0.0008	0%		8.76		10.54		11.24		11.58	-0.34	OK	NE					
RE*MSTTRUNK	GR22-02A	GR22-02	36	0.013	145.60	145.30	348	0.0009	2.78	12.7	0.0008	0%		8.76		10.54		11.24		11.58	-1.09	OK	NE					
RE*MSTTRUNK	GR22-02	R18H-78A	36	0.013	145.20	144.80	464	0.0009	2.78	12.7	0.0008	0%		8.76		10.54		11.24		11.58	-1.09	OK	NE					
Section			36	0.013		3.50	4297	0.0008	**2.70**	**12.3**	**0.0008**	0%		8.76		10.54		11.24		11.58	-0.73	OK	NE					OK
TO AUBURN3.R18H-78A																												

Task 240 Report: AUBURN PLANNING ZONE - REROUTING ALTERNATIV											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow Percent	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
AUBURN 3 TRUNK												100% MSTTRK	8.76	8.76	10.54	10.54	11.24	11.24	11.58	11.58			X					
												100% WINTSEWR	5.37	14.13	5.99	16.53	6.32	17.56	6.31	17.90			X					
RE*AUBURN3	R18H-78A	R18H-78	42	0.013	144.50	143.70	123	0.0065	8.46	52.5	0.0021	0%		14.13		16.53		17.56		17.90	-34.59	OK	NE					
RE*AUBURN3	R18H-78	R18H-77	42	0.013	143.70	140.90	480	0.0058	8.01	49.7	0.0021	0%		14.13		16.53		17.56		17.90	-31.81	OK	NE					
											0.0021	100% 26TH ST. TRUNK	1.13	15.26	1.72	18.25	1.84	19.40	1.89	19.79			X					
RE*AUBURN3	R18H-77	R18H-76	42	0.013	140.90	138.10	480	0.0058	8.01	49.7	0.0021	0%		15.26		18.25		19.40		19.79	-29.92	OK	NE					
RE*AUBURN3	R18H-76	R18H-75	42	0.013	138.10	135.30	480	0.0058	8.01	49.7	0.0021	0%		15.26		18.25		19.40		19.79	-29.92	OK	NE					
RE*AUBURN3	R18H-75	R18H-74	42	0.013	135.30	132.60	480	0.0056	7.86	48.8	0.0021	0%		15.26		18.25		19.40		19.79	-29.02	OK	NE					
Section			42	0.013		11.90	2043	0.0058	**8.00**	**49.7**	**0.0058**	0%		15.26		18.25		19.40		19.79	-29.88	OK	NE					OK
RE*AUBURN3	R18H-74	R18H-73	72	0.013	131.40	131.00	162	0.0025	7.46	136.1	0.0021	100% aub3-c	2.99	18.25	3.96	22.21	4.23	23.63	4.35	24.14	-112.00	OK	NE	0.01	0.40	0.39	0.25	
RE*AUBURN3	R18H-73	R18H-72	72	0.013	131.00	131.10	499	-0.0002			0.0021	0%		18.25		22.21		23.63		24.14	24.14	39	2010	0.04	-0.10	-0.14	-0.14	ignore
RE*AUBURN3	R18H-72	R18H-71	72	0.013	131.10	130.80	500	0.0006	3.68	67.1	0.0021	0%		18.25		22.21		23.63		24.14	-42.97	OK	NE					
RE*AUBURN3	R18H-71	R18H-70	72	0.013	130.80	130.60	365	0.0005	3.52	64.1	0.0021	0%		18.25		22.21		23.63		24.14	-39.99	OK	NE					
RE*AUBURN3	R18H-70	R18H-69	72	0.013	130.60	130.50	363	0.0003	2.49	45.5	0.0021	0%		18.25		22.21		23.63		24.14	-21.33	OK	NE					
RE*AUBURN3	R18H-69	R18H-68	72	0.013	130.50	130.30	84	0.0024	7.33	133.7	0.0021	0%		18.25		22.21		23.63		24.14	-109.54	OK	NE					
RE*AUBURN3	R18H-68	R18H-67	72	0.013	130.30	130.10	421	0.0005	3.27	59.7	0.0021	0%		18.25		22.21		23.63		24.14	-35.58	OK	NE					
RE*AUBURN3	R18H-67	R18H-66	72	0.013	130.10	129.80	489	0.0006	3.72	67.9	0.0021	0%		18.25		22.21		23.63		24.14	-43.72	OK	NE					
RE*AUBURN3	R18H-66	R18H-65	72	0.013	129.80	129.20	489	0.0012	5.26	96.0	0.0021	0%		18.25		22.21		23.63		24.14	-71.83	OK	NE					
											0.0021	100% WEST VALLEY	4.46	22.71	5.01	27.22	5.30	28.93	5.35	29.49			X					
											0.0021	0%		22.71		27.22		28.93		29.49			X					
RE*AUBURN3	R18H-65	R18H-64	72	0.013	129.20	128.90	610	0.0005	3.33	60.8	0.0021	0%		22.71		27.22		28.93		29.49	-31.26	OK	NE					
RE*AUBURN3	R18H-64	R18H-63	72	0.013	128.90	128.60	612	0.0005	3.33	60.7	0.0021	0%		22.71		27.22		28.93		29.49	-31.17	OK	NE					
RE*AUBURN3	R18H-63	R18H-62	72	0.013	128.60	128.50	87	0.0011	5.09	92.9	0.0021	0%		22.71		27.22		28.93		29.49	-63.39	OK	NE					
RE*AUBURN3	R18H-62	R18H-61	72	0.013	128.50	128.30	275	0.0007	4.05	73.9	0.0021	0%		22.71		27.22		28.93		29.49	-44.39	OK	NE					
RE*AUBURN3	R18H-61	R18H-59	72	0.013	128.30	127.90	556	0.0007	4.03	73.5	0.0021	0%		22.71		27.22		28.93		29.49	-43.99	OK	NE					
RE*AUBURN3	R18H-59	R18H-58	72	0.013	127.90	127.50	460	0.0009	4.43	80.8	0.0021	0%		22.71		27.22		28.93		29.49	-51.30	OK	NE					
Section			72	0.013		3.90	5972	0.0007	**3.84**	**70.0**	**0.0007**	0%		22.71		27.22		28.93		29.49	-40.52	OK	NE					OK
												0%		22.71		27.22		28.93		29.49			X					
												0%		22.71		27.22		28.93		29.49			X					
												50% aub3-nw	0.88	23.59	1.15	28.38	1.22	30.16	1.23	30.72			X					
RE*AUBURN3	R18H-58	R18H-57	72	0.013	127.46	127.63	82	-0.0021			0.0006	0%		23.59		28.38		30.16		30.72	30.72	57	2010	0.01	-0.17	-0.18	-0.18	ignore
RE*AUBURN3	R18H-57	R18H-56	72	0.013	127.60	127.10	582	0.0009	4.40	80.3	0.0006	0%		23.59		28.38		30.16		30.72	-49.58	OK	NE					
RE*AUBURN3	R18H-56	R18H-55	72	0.013	127.10	126.80	525	0.0006	3.59	65.5	0.0006	0%		23.59		28.38		30.16		30.72	-34.77	OK	NE					
RE*AUBURN3	R18H-55	R18H-54	72	0.013	126.80	126.50	513	0.0006	3.63	66.3	0.0006	0%		23.59		28.38		30.16		30.72	-35.53	OK	NE					
RE*AUBURN3	R18H-54	R18H-53	72	0.013	126.50	126.10	515	0.0008	4.19	76.4	0.0006	0%		23.59		28.38		30.16		30.72	-45.63	OK	NE					
RE*AUBURN3	R18H-53	R18H-52	72	0.013	126.10	125.80	578	0.0005	3.42	62.4	0.0006	0%		23.59		28.38		30.16		30.72	-31.69	OK	NE					
RE*AUBURN3	R18H-52	R18H-51	72	0.013	125.80	125.50	530	0.0006	3.57	65.2	0.0006	0%		23.59		28.38		30.16		30.72	-34.46	OK	NE					
RE*AUBURN3	R18H-51	R18H-50	72	0.013	125.50	125.00	530	0.0009	4.61	84.1	0.0006	0%		23.59		28.38		30.16		30.72	-53.42	OK	NE					
RE*AUBURN3	R18H-50	R18H-49	72	0.013	125.00	124.70	311	0.0010	4.66	85.1	0.0006	0%		23.59		28.38		30.16		30.72	-54.37	OK	NE					
RE*AUBURN3	R18H-49	R18H-48	72	0.013	124.70	124.50	1000	0.0002	2.12	38.7	0.0006	0%		23.59		28.38		30.16		30.72	-8.02	OK	NE					
Section			72	0.013		2.96	5166	0.0006	**3.60**	**65.6**	**0.0006**	0%		23.59		28.38		30.16		30.72	-34.86	OK	NE					OK
														54.65		**70.70**		**75.08**	**76.2**	**76.22**	**CHECK**							

Task 240 Report: AUBURN PLANNING ZONE - REROUTING ALTERNATIV											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow Percent	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Excess (MGD)	Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ− Δfull	BW elev	Proposed Diameter (inches)
*RWSP pipe or section data revised.																												

APPENDIX 240-G

KENT PLANNING ZONE PARALLEL ALTERNATIVE FLOW ROUTING

Task 240 Report:
KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE

											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP- STREAM MH #	DOWN-STREAM MH #	DIA (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow (%)	2010 Inflow (MGD)	Total (MGD)	2020Inflow (MGD)	Total (MGD)	2030 Inflow (MGD)	Total (MGD)	2050 Inflow (MGD)	Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ–Δfull	BW elev	Proposed Diameter (inches)
do not delete this line																												
												100% AUBURN3-BASE	54.65	54.7	70.70	70.7	75.08	75.1	76.22	76.2			X					
RE*AUBURN3	R18H-48	R18H-47	72	0.013	124.50	123.70	659	0.0012	5.23	95.5	0.0007	0%		54.7		70.7		75.1		76.2	-19.2	OK	NE					
												100% S256TH CORR	20.10	74.7	27.93	98.6	29.66	104.7	30.22	106.4			X					
												100% S SOOS	3.27	78.0	5.56	104.2	5.96	110.7	6.18	112.6			X					
RE*AUBURN3	R18H-47	R18H-45	72	0.013	123.70	123.30	827	0.0005	3.30	60.3	0.0007	0%		78.0		104.2		110.7		112.6	52.4	66	2010					
RE*AUBURN3	R18H-45	R18H-44	72	0.013	123.30	123.20	454	0.0002	2.23	40.7	0.0007	10% aub2-s	0.40	78.4	0.69	104.9	0.74	111.4	0.75	113.4	72.7	72	2010					
RE*AUBURN3	R18H-44	R18H-43	72	0.013	123.20	122.90	592	0.0005	3.38	61.7	0.0007	0%		78.4		104.9		111.4		113.4	51.7	63	2010					
RE*AUBURN3	R18H-43	R18H-42	72	0.013	122.90	122.40	575	0.0009	4.43	80.8	0.0007	0%		78.4		104.9		111.4		113.4	32.6	54	2020					
Section			72	0.013		2.10	3107	0.0007		74.5	0.0007	0%		78.4		104.9		111.4		113.4	38.8	57	2010					57
RE*AUBURN2	R18H-42	R18H-41	72	0.013	122.40	122.00	575	0.0007	3.96	72.3	0.0007	68% aub2-s	2.71	81.1	4.71	109.6	5.01	116.4	5.10	118.5	46.2	63	2010					
RE*AUBURN2	R18H-41	R18H-40	72	0.013	122.00	121.60	575	0.0007	3.96	72.3	0.0007	0%		81.1		109.6		116.4		118.5	46.2	63	2010					
RE*AUBURN2	R18H-40	R18H-39	72	0.013	121.60	121.10	518	0.0010	4.67	85.1	0.0007	0%		81.1		109.6		116.4		118.5	33.3	54	2020					
RE*AUBURN2	R18H-39	R18H-38	72	0.013	121.10	120.80	570	0.0005	3.45	62.9	0.0007	0%		81.1		109.6		116.4		118.5	55.6	66	2010					
RE*AUBURN2	R18H-38	R18H-37	72	0.013	120.80	120.20	610	0.0010	4.71	85.9	0.0007	22% aub2-s	0.88	82.0	1.52	111.1	1.62	118.1	1.65	120.1	34.2	54	2020					
RE*AUBURN2*	R18H-37	R18H-36	72	0.013	120.20	119.51	610	0.0011	5.05	92.1	0.0007	0%		82.0		111.1		118.1		120.1	28.0	51	2020					
RE*AUBURN2*	R18H-36	R18H-35	72	0.013	119.51	119.56	155	-0.0003			0.0007	0%		82.0		111.1		118.1		120.1	120.1	87	2010					
Section			72	0.013		2.84	3613	0.0008		76.8	0.0008	0%		82.0		111.1		118.1		120.1	43.3	60	2010					60
RE*AUBURN2 SIPHON	R18H-35	R18H-34	54	0.013	119.56	118.40	200	0.0058	64%	96.9		0%		27.3		56.4		63.3		65.4	-31.5		NE					
RE*AUBURN2 SIPHON	R18H-35	R18H-34	42	0.013	119.56	118.40	200	0.0058	33%	49.6		0%		49.6		49.6		49.6		49.6			NE					
RE*AUBURN2 SIPHON	R18H-35	R18H-34	18	0.013	119.56	118.40	200	0.0058	3%	5.2		0%		5.2		5.2		5.2		5.2			NE					
Section			64	0.013	119.56	118.40	200					0%		82.0		111.1		118.1		120.1	120.1	OK	NE	ok				OK
RE*AUBURN2	R18H-34	R18H-33	72	0.013	118.40	118.30	186	0.0005	3.48	63.5	0.0008	70% aub2-n	1.76	83.8	1.88	113.0	2.00	120.1	2.03	122.1	58.6	66	2010					
RE*AUBURN2	R18H-33	R18H-32	72	0.013	118.30	117.90	535	0.0007	4.11	74.9	0.0008	0%		83.8		113.0		120.1		122.1	47.2	63	2010					
RE*AUBURN2	R18H-32	R18H-31	72	0.013	117.90	117.50	517	0.0008	4.18	76.2	0.0008	0%		83.8		113.0		120.1		122.1	45.9	60	2010					
RE*AUBURN2	R18H-31	R18H-30	72	0.013	117.50	117.10	518	0.0008	4.17	76.1	0.0008	0%		83.8		113.0		120.1		122.1	46.0	60	2010					
RE*AUBURN2	R18H-30	R18H-29	72	0.013	117.10	116.40	517	0.0014	5.53	100.8	0.0008	0%		83.8		113.0		120.1		122.1	21.3	45	2020					
RE*AUBURN2	R18H-29	R18H-28	72	0.013	116.40	115.90	517	0.0010	4.67	85.2	0.0008	0%		83.8		113.0		120.1		122.1	36.9	57	2020					
RE*AUBURN2@ SR516	R18H-28	R18H-27	72	0.013	115.90	116.10	220	-0.0009			0.0008	0%		83.8		113.0		120.1		122.1	122.1	87	2010					
RE*AUBURN2@ SR516	R18H-27	R18H-26	72	0.013	116.10	115.90	179	0.0011	5.02	91.6	0.0008	30% aub2-n	0.75	84.5	0.81	113.8	0.86	120.9	0.87	123.0	31.4	54	2020					
RE*AUBURN2	R18H-26	R18H-25	72	0.013	115.90	115.70	416	0.0005	3.29	60.1	0.0008	0%		84.5		113.8		120.9		123.0	62.9	69	2010					
RE*AUBURN2	R18H-25	R18H-24	72	0.013	115.70	114.40	736	0.0018	6.31	115.1	0.0008	0%		84.5		113.8		120.9		123.0	7.9	33	2030					
RE*AUBURN2	R18H-24	R18H-23	72	0.013	114.40	114.70	116	-0.0026			0.0008	0%		84.5		113.8		120.9		123.0	123.0	87	2010					
RE*AUBURN2	R18H-23	R18H-22	72	0.013	114.70	114.50	577	0.0003	2.80	51.0	0.0008	0%		84.5		113.8		120.9		123.0	72.0	72	2010					
Section			72	0.013		3.90	5034	0.0008		76.3	0.0008	0%		84.5		113.8		120.9		123.0	46.8	60	2010					60
RE*AUBURN1	R18H-22	R18H-21A	72	0.013	114.50	114.20	410	0.0007	4.06	74.1	0.0008	0%		84.5		113.8		120.9		123.0	48.9	63	2010					
RE*AUBURN1	R18H-21A	R18H-21	72	0.013	114.20	113.90	410	0.0007	4.06	74.1	0.0008	0%		84.5		113.8		120.9		123.0	48.9	63	2010					
RE*AUBURN1	R18H-21	R18H-19	72	0.013	113.90	113.60	492	0.0006	3.71	67.7	0.0008	0%		84.5		113.8		120.9		123.0	55.4	66	2010					
RE*AUBURN1@ SR 167	R18H-19	R18H-18	72	0.013	113.60	113.20	260	0.0015	5.89	107.5	0.0008	0%		84.5		113.8		120.9		123.0	15.6	42	2020					
RE*AUBURN1	R18H-18	R18H-17	72	0.013	113.20	112.90	260	0.0012	5.10	93.1	0.0008	0%		84.5		113.8		120.9		123.0	30.0	51	2020					
RE*AUBURN1	R18H-17	R18H-16	72	0.013	112.90	112.50	468	0.0009	4.39	80.1	0.0008	0%		84.5		113.8		120.9		123.0	42.9	60	2010					
RE*AUBURN1	R18H-16	R18H-15	72	0.013	112.50	112.20	413	0.0007	4.05	73.8	0.0008	0%		84.5		113.8		120.9		123.0	49.2	63	2010					
RE*AUBURN1	R18H-15	R18H-14	72	0.013	112.20	111.90	546	0.0005	3.52	64.2	0.0008	25% xval-x	0.29	84.8	0.30	114.1	0.32	121.2	0.32	123.3	59.1	66	2010					
RE*AUBURN1	R18H-14	R18H-13	72	0.013	111.90	111.50	540	0.0007	4.09	74.6	0.0008	0%		84.8		114.1		121.2		123.3	48.8	63	2010					
RE*AUBURN1	R18H-13	R18H-12	72	0.013	111.50	111.00	530	0.0009	4.61	84.1	0.0008	0%		84.8		114.1		121.2		123.3	39.2	57	2010					
RE*AUBURN1	R18H-12	R18H-11	72	0.013	111.00	110.50	655	0.0008	4.15	75.7	0.0008	0%		84.8		114.1		121.2		123.3	47.6	60	2010					
RE*AUBURN1	R18H-11	R18H-10	72	0.013	110.50	110.00	640	0.0008	4.20	76.6	0.0008	0%		84.8		114.1		121.2		123.3	46.8	60	2010					
RE*AUBURN1	R18H-10	R18H-09	72	0.013	110.00	109.60	398	0.0010	4.76	86.9	0.0008	0%		84.8		114.1		121.2		123.3	36.5	57	2020					
RE*AUBURN1	R18H-09	R18H-08	72	0.013	109.60	109.40	112	0.0018	6.35	115.8	0.0008	100% xval-s	0.41	85.2	0.43	114.5	0.46	121.7	0.46	123.8	8.0	33	2030					
RE*AUBURN1	R18H-08	R18H-07	72	0.013	109.40	109.10	629	0.0005	3.28	59.8	0.0008	0%		85.2		114.5		121.7		123.8	64.0	69	2010					
RE*AUBURN1	R18H-07	R18H-06	72	0.013	109.10	108.60	629	0.0008	4.23	77.2	0.0008	0%		85.2		114.5		121.7		123.8	46.6	60	2010					

Task 240 Report: KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP- STREAM MH #	DOWN-STREAM MH #	DIA (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow (%)	2010 Inflow (MGD)	Total (MGD)	2020Inflow (MGD)	Total (MGD)	2030 Inflow (MGD)	Total (MGD)	2050 Inflow (MGD)	Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
RE*AUBURN1	R18H-06	R18H-05	72	0.013	108.60	108.00	534	0.0011	5.03	91.8	0.0008	0%		85.2		114.5		121.7		123.8	32.0	54	2020					
RE*AUBURN1	R18H-05	R18H-04	72	0.013	108.00	107.50	565	0.0009	4.47	81.5	0.0008	0%		85.2		114.5		121.7		123.8	42.3	60	2010					
RE*AUBURN1	R18H-04	R18H-03	72	0.013	107.50	107.20	494	0.0006	3.70	67.5	0.0008	0%		85.2		114.5		121.7		123.8	56.3	66	2010					
RE*AUBURN1	R18H-03	R18H-02	72	0.013	107.20	106.80	520	0.0008	4.17	76.0	0.0008	0%		85.2		114.5		121.7		123.8	47.8	60	2010					
RE*AUBURN1	R18H-02	R18H-01	72	0.013	106.80	106.40	520	0.0008	4.17	76.0	0.0008	0%		85.2		114.5		121.7		123.8	47.8	60	2010					
	Section		72	0.013		8.10	10025	0.0008		77.9	0.0008	0%		85.2		114.5		121.7		123.8	45.9	60	2010					60
RE*AUBURN1	R18H-01	R18G-01A	60	0.013	106.40	105.90	36	0.0139	15.67	198.6	0.0026	25% xval-x	0.29	85.5	0.30	114.8	0.32	122.0	0.32	124.1	-74.4	OK	NE					
RE*KENTX	R18G-01A	R18G-01	72	0.013	104.00	103.80	635	0.0003	2.67	48.6	0.0026	-35% AUBURN1-SPLIT	-29.92	55.6	-40.20	74.7	-42.71	79.3	-43.44	80.7	32.1	42	2010					
RE*KENTX	R18G-01	52	72	0.013	103.80	103.70	353	0.0003	2.53	46.1	0.0026	0%		55.6		74.7		79.3		80.7	34.6	45	2010					
	Section		72	0.013		2.70	1024	0.0026		140.7	0.0026	0%		55.6		74.7		79.3		80.7	-60.0	OK	NE					OK
TO ULID1/5#52																												

Task 240 Report: KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP- STREAM MH #	DOWN- STREAM MH #	DIA (IN)	Manning n	UP- STREAM INV ELEV	DOWN- STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow (%)	2010 Inflow (MGD)	Total (MGD)	2020Inflow (MGD)	Total (MGD)	2030 Inflow (MGD)	Total (MGD)	2050 Inflow (MGD)	Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
not delete this line												0%																
RE*WHILL	15	14	24	0.013	155.30	153.30	221	0.0090	6.87	13.9	0.0061	100% whill-x	6.23	6.2	7.62	7.6	8.09	8.1	8.20	8.2	-5.7	OK	NE					
RE*WHILL	14	13	24	0.013	153.30	146.20	249	0.0285	12.19	24.7	0.0061	0%		6.2		7.6		8.1		8.2	-16.5	OK	NE	0.8	7.1	6.3	5.3	
RE*WHILL	13	12	24	0.013	146.20	145.40	286	0.0028	3.82	7.7	0.0061	0%		6.2		7.6		8.1		8.2	0.5	9	2030	0.9	0.8	-0.1	-1.0	ignore
RE*WHILL	12	11	24	0.013	145.40	144.60	514	0.0016	2.85	5.8	0.0061	0%		6.2		7.6		8.1		8.2	2.4	15	2010	1.6	0.8	-0.8	-0.9	ignore
RE*WHILL	11	10	24	0.013	144.60	144.40	95	0.0021	3.31	6.7	0.0061	0%		6.2		7.6		8.1		8.2	1.5	12	2020	0.3	0.2	-0.1	-0.1	ignore
RE*WHILL	10	09	24	0.013	144.40	143.50	222	0.0041	4.60	9.3	0.0061	0%		6.2		7.6		8.1		8.2	-1.1	OK	NE					
RE*WHILL	09	08	24	0.013	143.50	142.30	305	0.0039	4.53	9.2	0.0061	0%		6.2		7.6		8.1		8.2	-1.0	OK	NE					
RE*WHILL	08	07	24	0.013	142.30	140.00	344	0.0067	5.90	12.0	0.0061	0%		6.2		7.6		8.1		8.2	-3.8	OK	NE					
RE*WHILL	07	06A	24	0.013	140.00	131.20	500	0.0176	9.58	19.4	0.0061	0%		6.2		7.6		8.1		8.2	-11.2	OK	NE					
RE*WHILL	06A	06B	24	0.013	131.20	131.10	15	0.0067	5.90	11.9	0.0061	0%		6.2		7.6		8.1		8.2	-3.7	OK	NE					
RE*WHILL	06B	06	24	0.013	131.10	130.40	335	0.0021	3.30	6.7	0.0061	0%		6.2		7.6		8.1		8.2	1.5	12	2020	1.0	0.7	-0.3	-1.8	12
RE*WHILL	06	05	24	0.013	130.40	129.70	350	0.0020	3.23	6.5	0.0061	0%		6.2		7.6		8.1		8.2	1.7	12	2020	1.1	0.7	-0.4	-1.4	12
RE*WHILL	05	04	24	0.013	129.70	128.70	500	0.0020	3.23	6.5	0.0061	0%		6.2		7.6		8.1		8.2	1.7	12	2020	1.6	1.0	-0.6	-1.0	12
RE*WHILL	04	03	24	0.013	128.70	127.90	410	0.0020	3.19	6.5	0.0061	0%		6.2		7.6		8.1		8.2	1.7	12	2020	1.3	0.8	-0.5	-0.5	12
RE*WHILL	03	02	24	0.013	128.90	127.00	413	0.0046	4.90	9.9	0.0061	0%		6.2		7.6		8.1		8.2	-1.7	OK	NE					
RE*WHILL	02	01A	24	0.013	127.00	126.50	240	0.0021	3.29	6.7	0.0061	50% ulid4-x	1.17	7.4	1.35	9.0	1.43	9.5	1.45	9.6	3.0	15	2010	1.0	0.5	-0.5	-0.9	ignore
RE*WHILL	01A	01	24	0.013	126.50	126.40	96	0.0010	2.33	4.7	0.0061	0%		7.4		9.0		9.5		9.6	4.9	18	2010	0.4	0.1	-0.3	-0.3	ignore
RE*WHILL	01	S-31A	24	0.013	126.40	125.70	40	0.0175	9.55	19.4	0.0061	0%		7.4		9.0		9.5		9.6	-9.7	OK	NE					
RE*WHILL	S-31A	S-31B	24	0.013	125.70	125.50	294	0.0007	1.88	3.8	0.0061	0%		7.4		9.0		9.5		9.6	5.8	21	2010	1.3	0.2	-1.1	-1.1	21
	Section		24	0.013		29.80	5429	0.0055		10.8	0.0055	0%		7.4		9.0		9.5		9.6	-1.2	OK	NE					OK
RE*WHILL	S-31B	S-31	24	0.013	125.50	122.30	14	0.2286	34.52	70.0	0.0061	0%		7.4		9.0		9.5		9.6	-60.3	OK	NE					
RE*ULID1/4	S-31	S-30	24	0.013	122.30	121.50	448	0.0018	3.05	6.2	0.0015	0%		7.4		9.0		9.5		9.6	3.5	21	2010					
RE*ULID1/4	S-30	S-29	24	0.013	121.50	120.00	454	0.0033	4.15	8.4	0.0015	5% ulid4-x	0.12	7.5	0.13	9.1	0.14	9.7	0.14	9.8	1.4	15	2020					
RE*ULID1/4	S-29	S-28	24	0.013	120.00	119.90	443	0.0002	1.09	2.2	0.0015	0%		7.5		9.1		9.7		9.8	7.6	27	2010					
RE*ULID1/4	S-28	S-27	24	0.013	119.90	119.10	446	0.0018	3.06	6.2	0.0015	30% ulid4-x	0.70	8.2	0.81	9.9	0.86	10.5	0.87	10.7	4.5	24	2010					
RE*ULID1/4	S-27	S-26	24	0.013	119.10	118.10	463	0.0022	3.35	6.8	0.0015	0%		8.2		9.9		10.5		10.7	3.9	21	2010					
RE*ULID1/4	S-26	S-25	24	0.013	118.10	117.30	405	0.0020	3.21	6.5	0.0015	0%		8.2		9.9		10.5		10.7	4.2	24	2010					
RE*ULID1/4	S-25	S-24	24	0.013	117.30	116.70	285	0.0021	3.31	6.7	0.0015	0%		8.2		9.9		10.5		10.7	3.9	21	2010					
RE*ULID1/4	S-24	S-23	24	0.013	116.70	115.90	353	0.0023	3.44	7.0	0.0015	0%		8.2		9.9		10.5		10.7	3.7	21	2010					
	Section		24	0.013		6.40	3297	0.0019		6.4	0.0019	0%		8.2		9.9		10.5		10.7	4.2	21	2010					21
RE*ULID1/4	S-23	S-22	30	0.013	115.90	115.30	348	0.0017	3.48	11.0	0.0015	15% ulid4-x	0.35	8.6	0.40	10.3	0.43	10.9	0.43	11.1	0.1	6	2050					
RE*ULID1/4	S-22	S-20	30	0.013	115.30	115.00	409	0.0007	2.27	7.2	0.0015	0%		8.6		10.3		10.9		11.1	3.9	21	2010					
RE*ULID1/4	S-20	S-19	30	0.013	115.00	114.70	320	0.0009	2.56	8.1	0.0015	0%		8.6		10.3		10.9		11.1	3.0	21	2010					
RE*ULID1/4	S-19	S-18	30	0.013	114.70	114.50	201	0.0010	2.64	8.4	0.0015	20% 250s-x	0.66	9.2	0.80	11.1	0.85	11.8	0.86	11.9	3.6	21	2010					
RE*ULID1/4	S-18	S-17	30	0.013	114.50	114.20	185	0.0016	3.37	10.7	0.0015	0%		9.2		11.1		11.8		11.9	1.3	15	2020					
	Section		30	0.013		1.70	1463	0.0012		9.0	0.0012	0%		9.2		11.1		11.8		11.9	2.9	21	2010					21
RE*ULID250	S-17	S-16	30	0.013	114.20	114.00	290	0.0007	2.20	7.0	0.0015	0%		9.2		11.1		11.8		11.9	5.0	24	2010					
RE*ULID250	S-16	S-15A	30	0.013	114.00	113.60	500	0.0008	2.37	7.5	0.0015	0%		9.2		11.1		11.8		11.9	4.4	24	2010					
RE*ULID250	S-15	S-14	30	0.013	113.60	113.10	502	0.0010	2.64	8.4	0.0015	0%		9.2		11.1		11.8		11.9	3.6	21	2010					
RE*ULID250	S-14	S-13	30	0.013	113.10	112.60	500	0.0010	2.65	8.4	0.0015	0%		9.2		11.1		11.8		11.9	3.6	21	2010					
RE*ULID250	S-13	S-12	30	0.013	112.60	112.20	500	0.0008	2.37	7.5	0.0015	0%		9.2		11.1		11.8		11.9	4.4	24	2010					
RE*ULID250	S-12	S-11	30	0.013	112.20	111.40	324	0.0025	4.16	13.2	0.0015	0%		9.2		11.1		11.8		11.9	-1.2	OK	NE					
RE*ULID250	S-11	S-10	30	0.013	111.40	111.30	440	0.0002	1.26	4.0	0.0015	0%		9.2		11.1		11.8		11.9	7.9	30	2010					
	Section		30	0.013		2.90	3056	0.0009		8.2	0.0015	0%		9.2		11.1		11.8		11.9	3.8	21	2010					21
RE*ULID250	S-10	S-09	36	0.013	111.30	111.10	445	0.0004	2.01	9.1	0.0015	0%		9.2		11.1		11.8		11.9	2.8	21	2010					
RE*ULID250	S-09	S-08	36	0.013	111.10	110.90	446	0.0004	2.00	9.1	0.0015	0%		9.2		11.1		11.8		11.9	2.8	21	2010					
RE*ULID250	S-08	S-07	36	0.013	110.90	110.80	350	0.0003	1.60	7.3	0.0015	0%		9.2		11.1		11.8		11.9	4.7	24	2010					
RE*ULID250	S-07	S-06	36	0.013	110.80	110.50	497	0.0006	2.32	10.6	0.0015	0%		9.2		11.1		11.8		11.9	1.3	15	2020					
	Section*		36	0.013		0.80	1738	0.0005	2.03	9.3	0.0015	0%		9.2		11.1		11.8		11.9	2.7	21	2020					21
RE*ULID250	S-06	S-05	36	0.013	110.50	110.20	305	0.0010	2.97	13.5	0.0015	0%		9.2		11.1		11.8		11.9	-1.6	OK	NE	0.2	0.3	0.1	-0.1	ignore
RE*ULID250	S-05	S-04A	36	0.013	110.20	110.10	255	0.0004	1.87	8.5	0.0015	0%		9.2		11.1		11.8		11.9	3.4	21	2010	0.2	0.1	-0.1	-0.1	ignore
RE*ULID250	S-04A	S-03	36	0.013	110.10	109.60	430	0.0012	3.23	14.7	0.0015	80% 250s-x	2.66	11.9	3.22	14.3	3.40	15.2	3.43	15.4	0.7	12	2030	0.5	0.5	0.0	0.0	ignore
RE*ULID250	S-03	S-02	36	0.013	109.60	109.00	432	0.0014	3.53	16.1	0.0015	0%		11.9		14.3		15.2		15.4	-0.7	OK	NE					
RE*ULID250	S-02	S-01	36	0.013	109.00	108.40	455	0.0013	3.44	15.7	0.0015	0%		11.9		14.3		15.2		15.4	-0.3	OK	NE					
RE*ULID250	S-01	N-01	36	0.013	108.40	107.80	503	0.0012	3.27	14.9	0.0015	0%		11.9		14.3		15.2		15.4	0.5	12	2030	0.6	0.6	0.0	0.0	ignore
RE*ULID250	N-01	N-02	36	0.013	107.80	105.90	525	0.0036	5.69	26.0	0.0015	0%		11.9		14.3		15.2		15.4	-10.6	OK	NE					
	Section*		36	0.013		4.60	2905	0.0016		17.2	0.0015	0%		11.9		14.3		15.2		15.4	-1.8	OK	NE					OK
D ULID 250 #N-02																												

Task 240 Report:
KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE

FACILITY	UP- STREAM MH #	DOWN-STREAM MH #	DIA (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow (%)	2010 Design Flow 2010 Inflow (MGD)	Total (MGD)	2020 Design Flow 2020Inflow (MGD)	Total (MGD)	2030 Design Flow 2030 Inflow (MGD)	Total (MGD)	2050 Design Flow 2050 Inflow (MGD)	Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
not delete this line												0%											X					
RE*ULID250	N-06G	N-06F	15	0.013	113.70	112.50	151	0.0079	4.70	3.7	0.0017	80% 250n-x	3.41	3.4	5.08	5.1	5.37	5.4	5.39	5.4	1.7	15	2020	2.5	1.2	-1.3	-1.3	ignore
RE*ULID250	N-06F	N-06E	27	0.013	112.50	110.70	455	0.0040	4.91	12.6	0.0017	0%		3.4		5.1		5.4		5.4	-7.2	OK	NE					
RE*ULID250	N-06E	N-06D	27	0.013	110.70	108.40	451	0.0051	5.58	14.3	0.0017	10% 250n-x	0.43	3.8	0.63	5.7	0.67	6.0	0.67	6.1	-8.2	OK	NE					
	Section		27	0.013		5.30	1057	0.0050		14.2	0.0050	0%		3.8		5.7		6.0		6.1	-8.1	OK	NE					OK
RE*ULID250	N-06D	N-06C	36	0.013	108.40	108.20	387	0.0005	2.15	9.8	0.0017	0%		3.8		5.7		6.0		6.1	-3.7	OK	NE					
RE*ULID250	N-06C	N-06B	36	0.013	108.20	108.10	282	0.0004	1.78	8.1	0.0017	0%		3.8		5.7		6.0		6.1	-2.1	OK	NE					
RE*ULID250	N-06B	N-06A	36	0.013	108.10	107.90	327	0.0006	2.34	10.7	0.0017	0%		3.8		5.7		6.0		6.1	-4.6	OK	NE					
RE*ULID250	N-06A	N-06	36	0.013	107.90	107.80	422	0.0002	1.46	6.6	0.0017	0%		3.8		5.7		6.0		6.1	-0.6	OK	NE					
RE*ULID250	N-06	N-05	36	0.013	107.80	107.70	180	0.0006	2.23	10.2	0.0017	0%		3.8		5.7		6.0		6.1	-4.1	OK	NE					
RE*ULID250	N-05	N-04	36	0.013	107.70	107.40	423	0.0007	2.52	11.5	0.0017	10% 250n-x	0.43	4.3	0.63	6.3	0.67	6.7	0.67	6.7	-4.8	OK	NE					
RE*ULID250	N-04	N-03	36	0.013	107.40	107.20	441	0.0005	2.01	9.2	0.0017	0%		4.3		6.3		6.7		6.7	-2.5	OK	NE					
RE*ULID250	N-03	N-02A	36	0.013	107.20	107.10	287	0.0003	1.77	8.1	0.0017	0%		4.3		6.3		6.7		6.7	-1.3	OK	NE					
	Section*		36	0.013		1.30	2749	0.0005	2.06	9.4	0.0005	0%		4.3		6.3		6.7		6.7	-2.6	OK	NE					OK
RE*ULID250	N-02A	N-02	36	0.013	107.10	105.90	135	0.0089		40.7	0.0089	100% ULID250S	11.90	16.2	14.33	20.7	15.20	21.9	15.38	22.1	-18.6	OK	NE					
	Section*		36	0.013		1.20	135	0.0089	8.92	40.7	0.0089	0%		16.2		20.7		21.9		22.1	-18.6	OK	NE					OK
RE*KENTX	R18G-07	R18G-06	54	0.013	106.00	105.60	625	0.0006	3.14	32.2	0.0007	25% xval-x	0.29	16.4	0.30	21.0	0.32	22.2	0.32	22.4	-9.7	OK	NE					
RE*KENTX	R18G-06	R18G-05	54	0.013	105.60	105.20	618	0.0006	3.15	32.4	0.0007	0%		16.4		21.0		22.2		22.4	-9.9	OK	NE					
RE*KENTX	R18G-05	R18G-04	54	0.013	105.20	105.40	74	-0.0027			0.0007	0%		16.4		21.0		22.2		22.4	22.4	48	2010					
RE*KENTX	R18G-04	R18G-03	54	0.013	105.40	105.00	619	0.0006	3.15	32.3	0.0007	0%		16.4		21.0		22.2		22.4	-9.9	OK	NE					
RE*KENTX to SI	R18G-03	R18A-57	54	0.013	105.00	104.10	664	0.0014	4.56	46.8	0.0007	0%		16.4		21.0		22.2		22.4	-24.4	OK	NE					
	Section		54	0.013		1.90	2600	0.0007	3.35	34.4	0.0007	0%		16.4		21.0		22.2		22.4	-11.9	OK	NE					OK
TO SOUTH INTERCEPTOR																												

KENT PLANNING ZONE
TASK 240 PARALLEL ALTERNATIVE

Task 240 Report: KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE

FACILITY	UP- STREAM MH #	DOWN- STREAM MH #	DIA (IN)	Manning n	UP- STREAM INV ELEV	DOWN- STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow (%)	2010 Design Flow 2010 Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow 2020Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow 2030 Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow 2050 Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW elev	Proposed Diameter (inches)
												5% mill-x	0.58	0.6	0.67	0.7	0.71	0.7	0.74	0.7			X					
RE*GARISN	R18-30	R18-29	24	0.013	378.04	377.67	110	0.0034	4.18	8.5	0.0553	70% gar-x	4.17	4.7	5.05	5.7	5.37	6.1	5.53	6.3	-2.2	OK	NE					
RE*GARISN	R18-29	R18-28	12	0.013	377.67	347.35	206	0.1472	17.46	8.8	0.0553	0%		4.7		5.7		6.1		6.3	-2.6	OK	NE					
RE*GARISN	R18-28	R18-27	12	0.013	347.35	326.23	195	0.1083	14.97	7.6	0.0553	0%		4.7		5.7		6.1		6.3	-1.3	OK	NE					
RE*GARISN	R18-27	R18-26	12	0.013	326.23	302.19	152	0.1580	18.08	9.2	0.0553	0%		4.7		5.7		6.1		6.3	-2.9	OK	NE					
RE*GARISN	R18-26	R18-25	12	0.013	302.19	276.30	335	0.0773	12.64	6.4	0.0553	0%		4.7		5.7		6.1		6.3	-0.1	OK	NE					
	Section		12	0.013		101.74	999	0.1019		7.4	0.1019	0%		4.7		5.7		6.1		6.3	-1.1	OK	NE					OK
RE*GARISN	R18-25	R18-24	18	0.013	275.59	273.89	325	0.0052	4.31	4.9	0.0553	0%		4.7		5.7		6.1		6.3	1.4	9	2020	2.8	1.7	-1.1	-6.6	
RE*GARISN	R18-24	R18-23	18	0.013	273.89	272.28	330	0.0049	4.16	4.7	0.0553	0%		4.7		5.7		6.1		6.3	1.5	9	2020	2.8	1.6	-1.2	-5.5	
	Section		18	0.013		3.31	655	0.0051		4.8	0.0051	0%		4.7		5.7		6.1		6.3	1.4	12	2020					12
RE*GARISN	R18-23	R18-22	12	0.013	272.28	254.65	235	0.0751	12.47	6.3	0.0553	10% gar-x	0.60	5.3	0.72	6.4	0.77	6.9	0.79	7.1	0.7	6	2020	21.9	17.6	-4.3	-4.3	6
RE*GARISN	R18-22	R18-21	12	0.013	254.65	223.41	210	0.1488	17.55	8.9	0.0553	0%		5.3		6.4		6.9		7.1	-1.8	OK	NE					
RE*GARISN	R18-21	R18-20	12	0.013	219.39	202.44	69	0.2459	22.55	11.4	0.0553	0%		5.3		6.4		6.9		7.1	-4.4	OK	NE					
RE*GARISN	R18-20	R18-19	12	0.013	202.44	190.27	97	0.1250	16.08	8.1	0.0553	0%		5.3		6.4		6.9		7.1	-1.1	OK	NE					
	Section		12	0.013		82.01	611	0.1342		8.4	0.1342	0%		5.3		6.4		6.9		7.1	-1.4	OK	NE					OK
RE*GARISN	R18-19	R18-18	15	0.013	190.27	188.11	202	0.0107	5.45	4.3	0.0553	0%		5.3		6.4		6.9		7.1	2.7	12	2010	5.8	2.2	-3.6	-3.6	12
RE*GARISN @ creek	R18-18	R18-17	15	0.013	188.11	171.18	356	0.0475	11.51	9.1	0.0553	0%		5.3		6.4		6.9		7.1	-2.0	OK	NE					
	Section		15	0.013		19.09	559	0.0342		7.7	0.0342	0%		5.3		6.4		6.9		7.1	-0.7	OK	NE					OK
RE*GARISN @ creek drop	R18-17	R18-15	18	0.013	167.15	165.29	386	0.0048	4.14	4.7	0.0553	0%		5.3		6.4		6.9		7.1	2.3	9	2010	4.2	1.9	-2.3	-4.0	
RE*GARISN @ creek	R18-15	R18-14	18	0.013	165.29	163.34	339	0.0058	4.52	5.2	0.0553	0%		5.3		6.4		6.9		7.1	1.9	9	2010	3.6	1.9	-1.7	-1.7	
RE*GARISN @ creek	R18-14	R18-13	18	0.013	163.34	162.29	66	0.0159	7.51	8.6	0.0553	20% gar-x	1.19	6.5	1.44	7.9	1.54	8.4	1.58	8.6	0.1	3	2050	1.1	1.1	0.0	0.0	
	Section		18	0.013		4.86	791	0.0061		5.3	0.0061	0%		6.5		7.9		8.4		8.6	3.3	18	2010					18
RE*GARISN	R18-13	R18-12A	24	0.013	161.70	161.47	101	0.0023	3.44	7.0	0.0553	0%		6.5		7.9		8.4		8.6	1.7	9	2020	0.4	0.2	-0.1	-0.9	
RE*GARISN	R18-12A	R18-12	24	0.013	161.47	161.21	155	0.0017	2.96	6.0	0.0553	0%		6.5		7.9		8.4		8.6	2.6	12	2010	0.5	0.3	-0.3	-0.8	
RE*GARISN	R18-12	R18-11	24	0.013	161.21	160.79	259	0.0016	2.91	5.9	0.0553	0%		6.5		7.9		8.4		8.6	2.7	12	2010	0.9	0.4	-0.5	-0.5	
	Section		24	0.013		0.91	515	0.0018		6.2	0.0018	0%		6.5		7.9		8.4		8.6	2.5	18	2010					18
RE*GARISN	R18-11	R18-10	18	0.013	160.79	130.78	356	0.0842	17.30	19.7	0.0553	0%		6.5		7.9		8.4		8.6	-11.1	OK	NE	5.7	30.0	24.3	23.5	
RE*GARISN drop	R18-10	R18-09	18	0.013	118.98	115.51	260	0.0133	6.88	7.8	0.0553	0%		6.5		7.9		8.4		8.6	0.8	6	2020	4.2	3.5	-0.7	-0.7	ignore
	Section		18	0.013		45.28	617	0.0734		18.4	0.0734	0%		6.5		7.9		8.4		8.6	-9.8	OK	NE					OK
RE*GARISN	R18-09	R18-08	24	0.013	115.51	115.09	420	0.0010	2.29	4.6	0.0015	34% c5e-x	0.44	7.0	0.49	8.4	0.52	8.9	0.53	9.2	4.5	24	2010					
RE*GARISN	R18-08	R18-07	24	0.013	115.09	114.54	413	0.0013	2.64	5.3	0.0015	0%		7.0		8.4		8.9		9.2	3.8	21	2010					
RE*GARISN	R18-07	R18-06	24	0.013	114.54	114.29	94	0.0027	3.72	7.5	0.0015	0%		7.0		8.4		8.9		9.2	1.6	18	2020					
RE*GARISN	R18-06	R18-04	24	0.013	114.29	114.42	134	-0.0010			0.0015	0%		7.0		8.4		8.9		9.2	9.2	30	2010					
RE*GARISN	R18-04	R18-03	24	0.013	114.42	113.88	418	0.0013	2.59	5.3	0.0015	0%		7.0		8.4		8.9		9.2	3.9	21	2010					
RE*GARISN	R18-03	R18-02A	24	0.013	113.84	113.39	350	0.0013	2.59	5.2	0.0015	0%		7.0		8.4		8.9		9.2	3.9	21	2010					
RE*GARISN	R18-02A	R18-02	24	0.013	113.39	113.29	96	0.0010	2.33	4.7	0.0015	0%		7.0		8.4		8.9		9.2	4.4	24	2010					
RE*GARISN	R18-02	R18-01	24	0.013	113.29	112.63	365	0.0018	3.07	6.2	0.0015	33% c5e-x	0.43	7.4	0.48	8.9	0.51	9.4	0.51	9.7	3.5	21	2010					
RE*GARISN	R18-01	R18-57I-A	24	0.013	112.63	112.50	306	0.0004	1.49	3.0	0.0015	0%		7.4		8.9		9.4		9.7	6.7	27	2010					
RE*GARISN	R18-57I-A	57I	24	0.013	112.50	112.40	19	0.0053	5.24	10.6	0.0015	0%		7.4		8.9		9.4		9.7	-0.9	OK	NE					
	Section		24	0.013		3.11	2614	0.0012		5.0	0.0012	0%		7.4		8.9		9.4		9.7	4.6	24	2010					24
RE*ULID1/5	57I	57H	24	0.013	112.40	112.00	404	0.0010	2.27	4.6	0.0015	0%		7.4		8.9		9.4		9.7	5.1	24	2010					
RE*ULID1/5	57H	57G	24	0.013	112.00	111.50	403	0.0012	2.54	5.2	0.0015	0%		7.4		8.9		9.4		9.7	4.5	24	2010					
RE*ULID1/5	57G	57F	24	0.013	111.50	111.00	351	0.0014	2.72	5.5	0.0015	33% c5e-x	0.43	7.8	0.48	9.3	0.51	9.9	0.51	10.2	4.7	24	2010					
RE*ULID1/5	57F	57E	24	0.013	111.00	110.60	350	0.0011	2.44	4.9	0.0015	0%		7.8		9.3		9.9		10.2	5.2	24	2010					
RE*ULID1/5	57E	57D	24	0.013	110.60	110.00	400	0.0015	2.80	5.7	0.0015	0%		7.8		9.3		9.9		10.2	4.5	24	2010					
RE*ULID1/5	57D	57C	24	0.013	110.00	109.40	400	0.0015	2.80	5.7	0.0015	0%		7.8		9.3		9.9		10.2	4.5	24	2010					
RE*ULID1/5	57C	57B	24	0.013	109.40	109.30	130	0.0008	2.00	4.1	0.0015	0%		7.8		9.3		9.9		10.2	6.1	27	2010					
RE*ULID1/5	57B	57AA	24	0.013	109.30	108.90	217	0.0018	3.10	6.3	0.0015	0%		7.8		9.3		9.9		10.2	3.9	21	2010					
RE*ULID1/5	57AA	57A	24	0.013	108.90	108.50	268	0.0015	2.79	5.7	0.0015	0%		7.8		9.3		9.9		10.2	4.5	24	2010					
RE*ULID1/5	57A	57	24	0.013	108.50	106.40	500	0.0042	4.68	9.5	0.0015	0%		7.8		9.3		9.9		10.2	0.7	12	2030					
	Section		24	0.013		6.00	3423	0.0018		6.1	0.0018	0%		7.8		9.3		9.9		10.2	4.1	21	2010					21
TO ULID 1/5.#57																												

Task 240 Report: KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP- STREAM MH #	DOWN-STREAM MH #	DIA (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow (%)	2010 Inflow (MGD)	Total (MGD)	2020Inflow (MGD)	Total (MGD)	2030 Inflow (MGD)	Total (MGD)	2050 Inflow (MGD)	Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ–Δfull	BW elev	Proposed Diameter (inches)
do not delete this line												100% mill-e	**2.58**	2.6	**3.36**	3.4	**3.61**	3.6	**3.78**	3.8			X					
RE*MILL	R18F-37A	R18F-37	27	0.013	444.60	442.00	440	0.0059	6.00	15.4	0.0218	25% mill-x	**2.90**	5.5	**3.34**	6.7	**3.57**	7.2	**3.68**	7.5	-7.9	OK	NE					
RE*MILL	R18F-37	R18F-36	21	0.013	442.00	434.70	428	0.0171	8.63	13.4	0.0218	0%		5.5		6.7		7.2		7.5	-5.9	OK	NE					
RE*MILL	R18F-36	R18F-35	21	0.013	434.70	428.90	335	0.0173	8.69	13.5	0.0218	0%		5.5		6.7		7.2		7.5	-6.0	OK	NE					
RE*MILL	R18F-35	R18F-34	21	0.013	428.90	423.00	340	0.0174	8.70	13.5	0.0218	0%		5.5		6.7		7.2		7.5	-6.0	OK	NE					
RE*MILL	R18F-34	R18F-33	21	0.013	423.00	417.00	358	0.0168	8.55	13.3	0.0218	0%		5.5		6.7		7.2		7.5	-5.8	OK	NE					
RE*MILL	R18F-33	R18F-32	21	0.013	417.00	411.00	358	0.0168	8.55	13.3	0.0218	0%		5.5		6.7		7.2		7.5	-5.8	OK	NE					
	Section		21	0.013		33.60	2259	0.0149		12.5	0.0149	0%		5.5		6.7		7.2		7.5	-5.0	OK	NE					OK
RE*MILL	R18F-32	R18F-31	24	0.013	411.00	408.50	408	0.0061	5.65	11.5	0.0218	0%		5.5		6.7		7.2		7.5	-4.0	OK	NE					
RE*MILL	R18F-31	R18F-30	24	0.013	408.50	406.70	307	0.0059	5.53	11.2	0.0218	0%		5.5		6.7		7.2		7.5	-3.7	OK	NE					
RE*MILL	R18F-30	R18F-29	24	0.013	406.70	404.80	320	0.0059	5.56	11.3	0.0218	0%		5.5		6.7		7.2		7.5	-3.8	OK	NE					
	Section		24	0.013		6.20	1035	0.0060		11.3	0.0060	0%		5.5		6.7		7.2		7.5	-3.9	OK	NE					OK
RE*MILL	R18F-29	R18F-28	21	0.013	404.80	400.50	359	0.0120	7.23	11.2	0.0218	12% mill-x	**1.39**	6.9	**1.61**	8.3	**1.71**	8.9	**1.77**	9.2	-2.0	OK	NE					
RE*MILL	R18F-28	R18F-27A	18	0.013	400.50	391.80	231	0.0377	11.57	13.2	0.0218	0%		6.9		8.3		8.9		9.2	-4.0	OK	NE					
RE*MILL	R18F-27A	R18F-27	18	0.013	391.80	388.20	80	0.0450	12.64	14.4	0.0218	0%		6.9		8.3		8.9		9.2	-5.2	OK	NE					
RE*MILL	R18F-27	R18F-26	18	0.013	388.20	371.10	379	0.0451	12.66	14.4	0.0218	0%		6.9		8.3		8.9		9.2	-5.2	OK	NE					
RE*MILL	R18F-26	R18F-25	18	0.013	371.10	348.40	367	0.0619	14.82	16.9	0.0218	0%		6.9		8.3		8.9		9.2	-7.7	OK	NE					
RE*MILL	R18F-25	R18F-24	18	0.013	348.40	334.30	318	0.0443	12.55	14.3	0.0218	0%		6.9		8.3		8.9		9.2	-5.1	OK	NE					
RE*MILL	R18F-24	R18F-23	18	0.013	334.30	309.00	405	0.0625	14.90	17.0	0.0218	0%		6.9		8.3		8.9		9.2	-7.8	OK	NE					
RE*MILL	R18F-23	R18F-22	18	0.013	309.00	278.20	395	0.0780	16.64	19.0	0.0218	0%		6.9		8.3		8.9		9.2	-9.7	OK	NE					
RE*MILL	R18F-22	R18F-21	18	0.013	278.20	263.00	195	0.0779	16.64	19.0	0.0218	0%		6.9		8.3		8.9		9.2	-9.7	OK	NE					
RE*MILL	R18F-21	R18F-20A	18	0.013	263.00	256.80	165	0.0376	11.56	13.2	0.0218	0%		6.9		8.3		8.9		9.2	-3.9	OK	NE					
RE*MILL	R18F-20A	R18F-20	18	0.013	256.80	252.30	90	0.0500	13.33	15.2	0.0218	0%		6.9		8.3		8.9		9.2	-6.0	OK	NE					
RE*MILL	R18F-20	R18F-19	18	0.013	252.30	238.80	292	0.0462	12.82	14.6	0.0218	0%		6.9		8.3		8.9		9.2	-5.4	OK	NE					
RE*MILL	R18F-19	R18F-18	18	0.013	238.80	216.90	347	0.0631	14.97	17.1	0.0218	0%		6.9		8.3		8.9		9.2	-7.8	OK	NE					
	Section		18	0.013		187.90	3623	0.0519	13.58	15.5	0.0519	0%		6.9		8.3		8.9		9.2	-6.2	OK	NE					OK
RE*MILL	R18F-18	R18F-17	21	0.013	216.90	213.00	290	0.0134	7.66	11.9	0.0218	0%		6.9		8.3		8.9		9.2	-2.7	OK	NE					
RE*MILL	R18F-17	R18F-16A	18	0.013	213.00	184.00	447	0.0649	15.18	17.3	0.0218	0%		6.9		8.3		8.9		9.2	-8.1	OK	NE					
RE*MILL	R18F-16A	R18F-16	18	0.013	184.00	182.70	14	0.0929	18.16	20.7	0.0218	0%		6.9		8.3		8.9		9.2	-11.5	OK	NE					
RE*MILL	R18F-16	R18F-15	18	0.013	182.70	174.60	118	0.0686	15.62	17.8	0.0218	0%		6.9		8.3		8.9		9.2	-8.6	OK	NE					
	Section		18	0.013		38.40	869	0.0442	12.53	14.3	0.0442	0%		6.9		8.3		8.9		9.2	-5.1	OK	NE					OK
RE*MILL	R18F-15	R18F-14	24	0.013	174.60	172.20	380	0.0063	5.74	11.6	0.0218	0%		6.9		8.3		8.9		9.2	-2.4	OK	NE					
RE*MILL	R18F-14	R18F-13	18	0.013	172.20	168.20	143	0.0280	9.97	11.4	0.0218	0%		6.9		8.3		8.9		9.2	-2.1	OK	NE					
RE*MILL	R18F-13	R18F-12	18	0.013	168.20	164.10	140	0.0293	10.20	11.6	0.0218	0%		6.9		8.3		8.9		9.2	-2.4	OK	NE					
RE*MILL	R18F-12	R18F-11	18	0.013	164.10	154.80	149	0.0624	14.89	17.0	0.0218	0%		6.9		8.3		8.9		9.2	-7.7	OK	NE					
RE*MILL	R18F-11	R18F-10	18	0.013	154.80	136.20	295	0.0631	14.97	17.1	0.0218	0%		6.9		8.3		8.9		9.2	-7.8	OK	NE					
	Section		18	0.013		38.40	1107	0.0347	11.10	12.7	0.0347	0%		6.9		8.3		8.9		9.2	-3.4	OK	NE					OK
RE*MILL	R18F-10	R18F-09	21	0.013	136.20	126.30	439	0.0226	9.92	15.4	0.0218	0%		6.9		8.3		8.9		9.2	-6.2	OK	NE					
	Section		21	0.013		9.90	439	0.0226	9.92	15.4	0.0218	0%		6.9		8.3		8.9		9.2	-6.2	OK	NE					OK
RE*MILL	R18F-09	R18F-07	30	0.013	126.30	125.00	465	0.0028	4.43	14.0	0.0218	25% mill-x	**2.90**	9.8	**3.34**	11.7	**3.57**	12.5	**3.68**	12.9	-1.1	OK	NE					
RE*MILL	R18F-07	R18F-06	30	0.013	125.00	124.40	424	0.0014	3.15	10.0	0.0218	0%		9.8		11.7		12.5		12.9	2.9	12	2020					
RE*MILL	R18F-06	R18F-05	30	0.013	124.40	123.40	483	0.0021	3.81	12.1	0.0218	25% mill-x	**2.90**	12.7	**3.34**	15.0	**3.57**	16.0	**3.68**	16.6	4.5	15	2010					
RE*MILL	R18F-05	R18F-04	30	0.013	123.40	122.00	547	0.0026	4.24	13.4	0.0218	0%		12.7		15.0		16.0		16.6	3.2	12	2020					
RE*MILL	R18F-04	R18F-03	30	0.013	122.00	120.60	540	0.0026	4.27	13.5	0.0218	0%		12.7		15.0		16.0		16.6	3.1	12	2020					
RE*MILL	R18F-03	R18F-02C	30	0.013	120.60	120.40	93	0.0022	3.88	12.3	0.0218	0%		12.7		15.0		16.0		16.6	4.3	15	2010					
RE*MILL	R18F-02C	R18F-02B	30	0.013	120.40	119.30	515	0.0021	3.87	12.3	0.0218	0%		12.7		15.0		16.0		16.6	4.3	15	2010					
RE*MILL	R18F-02B	R18F-02A	30	0.013	119.30	118.80	182	0.0027	4.39	13.9	0.0218	0%		12.7		15.0		16.0		16.6	2.7	12	2020					
RE*MILL	R18F-02A	R18F-02	30	0.013	118.80	118.70	67	0.0015	3.24	10.3	0.0218	0%		12.7		15.0		16.0		16.6	6.3	18	2010					
RE*MILL	R18F-02	R18F-01	30	0.013	118.70	117.50	375	0.0032	4.74	15.0	0.0218	0%		12.7		15.0		16.0		16.6	1.6	12	2030					
	Section		30	0.013		8.80	3691	0.0024	4.09	13.0	0.0024	0%		12.7		15.0		16.0		16.6	3.6	21	2020					21

Task 240 Report: KENT PLANNING ZONE - PARALLEL PIPE ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP- STREAM MH #	DOWN-STREAM MH #	DIA (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow (%)	2010 Inflow (MGD)	Total (MGD)	2020Inflow (MGD)	Total (MGD)	2030 Inflow (MGD)	Total (MGD)	2050 Inflow (MGD)	Total (MGD)	Excess (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ–Δfull	BW elev	Proposed Diameter (inches)
RE*ULID1/5	R18F-01	75	30	0.013	117.50	117.60	43	-0.0023			0.0218	0%		12.7		15.0		16.0		16.6	16.6	24	2010					
RE*ULID1/5	75	74AA	30	0.013	117.60	117.50	11	0.0091	7.99	25.3	0.0218	0%		12.7		15.0		16.0		16.6	-8.7	OK	NE					
RE*ULID1/5	74AA	74	30	0.013	117.50	117.40	109	0.0009	2.54	8.0	0.0218	0%		12.7		15.0		16.0		16.6	8.6	18	2010					
RE*ULID1/5	74	73	30	0.013	117.40	116.80	348	0.0017	3.48	11.0	0.0218	0%		12.7		15.0		16.0		16.6	5.6	15	2010					
RE*ULID1/5	73	72	30	0.013	116.80	116.10	400	0.0018	3.50	11.1	0.0218	0%		12.7		15.0		16.0		16.6	5.5	15	2010					
RE*ULID1/5	72	71	30	0.013	116.10	115.60	315	0.0016	3.34	10.6	0.0218	0%		12.7		15.0		16.0		16.6	6.0	15	2010					
RE*ULID1/5	71	70	30	0.013	115.60	115.20	270	0.0015	3.22	10.2	0.0218	0%		12.7		15.0		16.0		16.6	6.4	18	2010					
RE*ULID1/5	70	69	30	0.013	115.20	114.40	494	0.0016	3.37	10.7	0.0218	0%		12.7		15.0		16.0		16.6	5.9	15	2010					
RE*ULID1/5	69	68	30	0.013	114.40	113.70	485	0.0014	3.18	10.1	0.0218	0%		12.7		15.0		16.0		16.6	6.5	18	2010					
RE*ULID1/5 @SR167	68	67	30	0.013	113.70	113.50	123	0.0016	3.38	10.7	0.0218	0%		12.7		15.0		16.0		16.6	5.9	15	2010					
	Section		30	0.013		4.00	2598	0.0015	3.29	10.4	0.0015	0%		12.7		15.0		16.0		16.6	6.2	27	2010					27
RE*ULID1/5	67	66	27	0.013	113.50	113.00	296	0.0017	3.21	8.2	0.0015	0%		12.7		15.0		16.0		16.6	8.4	30	2010					
RE*ULID1/5	66	65	27	0.013	113.00	112.40	412	0.0015	2.98	7.6	0.0015	25% xval-x	**0.29**	13.0	**0.30**	15.3	**0.32**	16.3	**0.32**	16.9	9.3	30	2010					
RE*ULID1/5	65	64	27	0.013	112.40	111.70	467	0.0015	3.02	7.8	0.0015	0%		13.0		15.3		16.3		16.9	9.2	30	2010					
RE*ULID1/5	64	63	27	0.013	111.70	111.20	258	0.0019	3.44	8.8	0.0015	0%		13.0		15.3		16.3		16.9	8.1	30	2010					
RE*ULID1/5	63	62	27	0.013	111.20	110.50	404	0.0017	3.25	8.3	0.0015	8% mill-x	**0.93**	13.9	**1.07**	16.4	**1.14**	17.5	**1.18**	18.1	9.8	30	2010					
RE*ULID1/5	62	61	27	0.013	110.50	110.00	322	0.0016	3.08	7.9	0.0015	0%		13.9		16.4		17.5		18.1	10.2	30	2010					
	Section		27	0.013		3.50	2159	0.0016		8.1	0.0016	0%		13.9		16.4		17.5		18.1	10.0	30	2010					30
RE*ULID1/5	61	60	30	0.013	110.00	109.20	469	0.0017	3.46	11.0	0.0015	0%		13.9		16.4		17.5		18.1	7.1	27	2010					
RE*ULID1/5	60	59	30	0.013	109.20	108.70	430	0.0012	2.86	9.0	0.0015	0%		13.9		16.4		17.5		18.1	9.1	30	2010					
RE*ULID1/5	59	58	30	0.013	108.70	108.10	504	0.0012	2.89	9.2	0.0015	0%		13.9		16.4		17.5		18.1	8.9	30	2010					
RE*ULID1/5	58	57	30	0.013	108.10	107.60	419	0.0012	2.89	9.2	0.0015	0%		13.9		16.4		17.5		18.1	8.9	30	2010					
	Section		30	0.013		2.40	1822	0.0013		9.6	0.0013	0%		13.9		16.4		17.5		18.1	8.5	30	2010					30
RE*ULID1/5	57	R18-30	42	0.013	106.60	106.40	404	0.0005	2.33	14.5	0.0004	100% ULID1/5 57A	**7.84**	21.7	**9.33**	25.7	**9.93**	27.4	**10.20**	28.3	13.8	45	2010					
RE*ULID1/5	56	55	42	0.013	106.40	106.30	393	0.0003	1.67	10.4	0.0004	0%		21.7		25.7		27.4		28.3	17.9	48	2010					
RE*ULID1/5	55	54	42	0.013	106.30	106.10	432	0.0005	2.26	14.0	0.0004	0%		21.7		25.7		27.4		28.3	14.3	45	2010					
RE*ULID1/5	54	53	42	0.013	106.10	105.90	442	0.0005	2.23	13.8	0.0004	0%		21.7		25.7		27.4		28.3	14.4	45	2010					
	Section		42	0.013		0.70	1671	0.0004	2.15	13.3	0.0004	0%		21.7		25.7		27.4		28.3	15.0	45	2010					45
RE*ULID1/5	53	52	42	0.013	105.90	103.70	436	0.0050			0.0050	0%		21.7		25.7		27.4		28.3	28.3	36	2010					
	Section		42	0.013		2.20	436	0.0050		46.2	0.0050	0%		21.7		25.7		27.4		28.3	-17.9	OK	NE					OK
RE*ULID1/2	52	51	72	0.012	103.70	103.60	353	0.0003	2.74	50.0	0.0050	35% AUBURN1-SPLIT	**29.92**	51.6	**40.20**	65.9	**42.71**	70.1	**43.44**	71.7	21.8	33	2010					
												100% KENTXVAL TO SI	**16.45**	16.4	**20.98**	21.0	**22.23**	22.2	**22.44**	22.4			2010					
												65% AUBURN1-SPLIT	**55.57**	55.6	**74.65**	74.7	**79.32**	79.3	**80.68**	80.7			2010					
*RWSP pipe or section data revised.																			174.9	174.9	check							

APPENDIX 240-H

KENT PLANNING ZONE REROUTING ALTERNATIVE FLOW ROUTING

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
do not delete this line																												
												45% ulid4-x	1.06	1.06	1.21	1.21	1.29	1.29	1.30	1.30			X					
MEEKER TRUNK from WHILL 6B	6B	MT2	24	0.013	131.10	125.58	2400	0.0023	3.46	7.0	0.0023	60% whill-x	3.74	4.80	4.57	5.78	4.85	6.14	4.92	6.22	-0.80	OK	NE					
MEEKER TRUNK to SW Trunk	MT2	SWK3	24	0.013	125.58	120.06	2400	0.0023	3.46	7.0	0.0023	0%		4.80		5.78		6.14		6.22	-0.80	OK	NE					
	Section		24	0.013		11.04	4800	0.0023	3.46	7.0	0.0023	0%		4.80		5.78		6.14		6.22	-0.80	OK	NE					24
TO SOUTHWEST TRUNK																												
do not delete this line												0%																
JAMES TRUNK from MILL#6	R18F-06	JT2	36	0.013	123.90	118.14	3000	0.0019	4.15	18.9	0.0019	100% MILL #6	9.43	9.43	11.25	11.25	12.03	12.03	12.47	12.47	-6.44	OK	NE					
JAMES TRUNK to AUB1#19	JT2	AUB1#19	36	0.013	118.14	116.60	800	0.0019	4.15	18.9	0.0019	25% xval-x	0.29	9.71	0.30	11.55	0.32	12.35	0.32	12.79	-6.12	OK	NE					
	Section		36	0.013		7.30	3800	0.0019	4.15	18.9	0.0019	0%		9.71		11.55		12.35		12.79	-6.12	OK	NE					36
TO SOUTHWEST TRUNK																												
do not delete this line												0%																
SOUTHWEST TRUNK												100% SW TRUNK from Kent	31.06	31.06	42.32	42.32	44.92	44.92	45.50	45.50			X					
SW TRUNK @Aub3#48@124.5	SWK1	SWK2	72	0.013	123.90	123.12	1000	0.0008	4.19	76.5	0.0008	39% AUBURN3 #48	18.31	49.38	24.13	66.45	25.65	70.58	26.18	71.67	-4.84	OK	NE					
SW TRUNK	SWK2	SWK3	72	0.013	123.12	116.10	9000	0.0008	4.19	76.5	0.0008	0%		49.38		66.45		70.58		71.67	-4.84	OK	NE					
SW TRUNK @ Meeker	SWK3	SWK4	72	0.013	116.10	108.09	8800	0.0009	4.53	82.6	0.0009	100% MEEKER TRUNK	4.80	54.17	5.78	72.23	6.14	76.72	6.22	77.90	-4.75	OK	NE					
SW TRUNK	SWK4	SWK5	72	0.013	108.09	107.91	200	0.0009	4.53	82.6	0.0009	0%		54.17		72.23		76.72		77.90	-4.75	OK	NE					
SW TRUNK	SWK5	SWK6	72	0.013	107.91	107.36	600	0.0009	4.53	82.6	0.0009	0%		54.17		72.23		76.72		77.90	-4.75	OK	NE					
SW TRUNK to S. Int.	SWK6	R18A-56	72	0.013	107.36	107.00	400	0.0009	4.53	82.6	0.0009	0%		54.17		72.23		76.72		77.90	-4.75	OK	NE					
	Section		72	0.013		16.90	20000	0.0008	4.37	79.6	0.0008	0%		54.17		72.23		76.72		77.90	-1.74	OK	NE					72
TO SOUTH INTERCEPTOR																												

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow Percent	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
do not delete this line												100% AUBURN3 from Kent	23.59	23.59	28.38	28.38	30.16	30.16	30.72	30.72			X					
RE*AUBURN3	R18H-49	R18H-48	72	0.013	124.70	124.50	1000	0.0002	2.12	38.7	0.0008	0%		23.59		28.38		30.16		30.72	-8.02	OK	NE					
												100% S256TH CORR	20.10	43.68	27.93	56.31	29.66	59.82	30.22	60.94			X					
												100% S SOOS	3.27	46.95	5.56	61.87	5.96	65.78	6.18	67.12			X					
												-39% AUBURN3 #48	-18.31	28.64	-24.13	37.74	-25.65	40.13	-26.18	40.94			X					
RE*AUBURN3	R18H-48	R18H-47	72	0.013	124.50	123.70	659	0.0012	5.23	95.5	0.0008	0%		28.64		37.74		40.13		40.94	-54.52	OK	NE					
												0%		28.64		37.74		40.13		40.94			X					
RE*AUBURN3	R18H-47	R18H-45	72	0.013	123.70	123.30	827	0.0005	3.30	60.3	0.0008	0%		28.64		37.74		40.13		40.94	-19.31	OK	NE	0.18	0.40	0.22	0.21	
RE*AUBURN3	R18H-45	R18H-44	72	0.013	123.30	123.20	454	0.0002	2.23	40.7	0.0008	10% aub2-s	0.40	29.04	0.69	38.43	0.74	40.86	0.75	41.69	1.03	15	2030	0.10	0.10	0.00	0.00	ignore
RE*AUBURN3	R18H-44	R18H-43	72	0.013	123.20	122.90	592	0.0005	3.38	61.7	0.0008	0%		29.04		38.43		40.86		41.69	-19.98	OK	NE					
RE*AUBURN3	R18H-43	R18H-42	72	0.013	122.90	122.40	575	0.0009	4.43	80.8	0.0008	0%		29.04		38.43		40.86		41.69	-39.10	OK	NE					
	Section		72	0.013		2.30	3107	0.0007	4.09	74.5	0.0007	0%		29.04		38.43		40.86		41.69	-32.85	OK	NE					OK
RE*AUBURN2	R18H-42	R18H-41	72	0.013	122.40	122.00	575	0.0007	3.96	72.3	0.0008	68% aub2-s	2.71	31.75	4.71	43.15	5.01	45.87	5.10	46.79	-25.47	OK	NE					
RE*AUBURN2	R18H-41	R18H-40	72	0.013	122.00	121.60	575	0.0007	3.96	72.3	0.0008	0%		31.75		43.15		45.87		46.79	-25.47	OK	NE					
RE*AUBURN2	R18H-40	R18H-39	72	0.013	121.60	121.10	518	0.0010	4.67	85.1	0.0008	0%		31.75		43.15		45.87		46.79	-38.33	OK	NE					
RE*AUBURN2	R18H-39	R18H-38	72	0.013	121.10	120.80	570	0.0005	3.45	62.9	0.0008	0%		31.75		43.15		45.87		46.79	-16.06	OK	NE					
RE*AUBURN2	R18H-38	R18H-37	72	0.013	120.80	120.20	610	0.0010	4.71	85.9	0.0008	22% aub2-s	0.88	32.62	1.52	44.67	1.62	47.49	1.65	48.44	-37.49	OK	NE					
RE*AUBURN2*	R18H-37	R18H-36	72	0.013	120.20	119.51	610	0.0011	5.05	92.1	0.0008	0%		32.62		44.67		47.49		48.44	-43.70	OK	NE					
RE*AUBURN2*	R18H-36	R18H-35	72	0.013	119.51	119.56	155	-0.0003			0.0008	0%		32.62		44.67		47.49		48.44	48.44	63	2010					
	Section		72	0.013		2.84	3613	0.0008		76.8	0.0008	0%		32.62		44.67		47.49		48.44	-28.38	OK	NE					OK
RE*AUBURN2 SIPHON	R18H-35	R18H-34	54	0.013	119.56	118.40	200	0.0058	64%	96.9				32.62		44.67		47.49		48.44	-48.45	OK	NE					
RE*AUBURN2 SIPHON	R18H-35	R18H-34	42	0.013	119.56	118.40	200	0.0058	33%	49.6				32.62		44.67		47.49		48.44	-1.13	OK	NE					
RE*AUBURN2 SIPHON	R18H-35	R18H-34	18	0.013	119.56	118.40	200	0.0058	3%	5.2				32.62		44.67		47.49		48.44	43.26		2010					
	Section		64	0.013	119.56	118.40	200					0%		32.62		44.67		47.49		48.44								ok
RE*AUBURN2	R18H-34	R18H-33	72	0.013	118.40	118.30	186	0.0005	3.48	63.5	0.0008	70% aub2-n	1.76	34.38	1.88	46.55	2.00	49.49	2.03	50.47	-13.05	OK	NE					
RE*AUBURN2	R18H-33	R18H-32	72	0.013	118.30	117.90	535	0.0007	4.11	74.9	0.0008	0%		34.38		46.55		49.49		50.47	-24.44	OK	NE					
RE*AUBURN2	R18H-32	R18H-31	72	0.013	117.90	117.50	517	0.0008	4.18	76.2	0.0008	0%		34.38		46.55		49.49		50.47	-25.74	OK	NE					
RE*AUBURN2	R18H-31	R18H-30	72	0.013	117.50	117.10	518	0.0008	4.17	76.1	0.0008	0%		34.38		46.55		49.49		50.47	-25.66	OK	NE					
RE*AUBURN2	R18H-30	R18H-29	72	0.013	117.10	116.40	517	0.0014	5.53	100.8	0.0008	0%		34.38		46.55		49.49		50.47	-50.34	OK	NE					
RE*AUBURN2	R18H-29	R18H-28	72	0.013	116.40	115.90	517	0.0010	4.67	85.2	0.0008	0%		34.38		46.55		49.49		50.47	-34.73	OK	NE	0.17	0.50	0.33	0.05	
RE*AUBURN2 @SR516	R18H-28	R18H-27	72	0.013	115.90	116.10	220	-0.0009			0.0008	0%		34.38		46.55		49.49		50.47	50.47	63	2010	0.07	-0.20	-0.27	-0.27	ignore
RE*AUBURN2 @SR516	R18H-27	R18H-26	72	0.013	116.10	115.90	179	0.0011	5.02	91.6	0.0008	30% aub2-n	0.75	35.13	0.81	47.36	0.86	50.35	0.87	51.34	-40.23	OK	NE					
RE*AUBURN2	R18H-26	R18H-25	72	0.013	115.90	115.70	416	0.0005	3.29	60.1	0.0008	0%		35.13		47.36		50.35		51.34	-8.73	OK	NE					
RE*AUBURN2	R18H-25	R18H-24	72	0.013	115.70	114.40	736	0.0018	6.31	115.1	0.0008	0%		35.13		47.36		50.35		51.34	-63.80	OK	NE	0.26	1.30	1.04	0.70	
RE*AUBURN2	R18H-24	R18H-23	72	0.013	114.40	114.70	116	-0.0026			0.0008	0%		35.13		47.36		50.35		51.34	51.34	63	2010	0.04	-0.30	-0.34	-0.34	ignore
RE*AUBURN2	R18H-23	R18H-22	72	0.013	114.70	114.50	577	0.0003	2.80	51.0	0.0008	0%		35.13		47.36		50.35		51.34	0.33	12	2050	0.20	0.20	0.00	0.00	ignore
	Section		72	0.013		3.90	5034	0.0008	4.18	76.3	0.0008	0%		35.13		47.36		50.35		51.34	-24.92	OK	NE					OK
RE*AUBURN1	R18H-22	R18H-21A	72	0.013	114.50	114.20	410	0.0007	4.06	74.1	0.0008	0%		35.13		47.36		50.35		51.34	-22.77	OK	NE					
RE*AUBURN1	R18H-21A	R18H-21	72	0.013	114.20	113.90	410	0.0007	4.06	74.1	0.0008	0%		35.13		47.36		50.35		51.34	-22.77	OK	NE					
RE*AUBURN1	R18H-21	R18H-19	72	0.013	113.90	113.60	492	0.0006	3.71	67.7	0.0008	0%		35.13		47.36		50.35		51.34	-16.31	OK	NE					
RE*AUBURN1@ SR 167	R18H-19	R18H-18	72	0.013	113.60	113.20	260	0.0015	5.89	107.5	0.0008	100% JAMES TRUNK	9.71	44.84	11.55	58.91	12.35	62.70	12.79	64.13	-43.32	OK	NE					
RE*AUBURN1	R18H-18	R18H-17	72	0.013	113.20	112.90	260	0.0012	5.10	93.1	0.0008	0%		44.84		58.91		62.70		64.13	-28.93	OK	NE					
RE*AUBURN1	R18H-17	R18H-16	72	0.013	112.90	112.50	468	0.0009	4.39	80.1	0.0008	0%		44.84		58.91		62.70		64.13	-15.96	OK	NE					
RE*AUBURN1	R18H-16	R18H-15	72	0.013	112.50	112.20	413	0.0007	4.05	73.8	0.0008	0%		44.84		58.91		62.70		64.13	-9.70	OK	NE	0.23	0.30	0.07	0.07	
RE*AUBURN1	R18H-15	R18H-14	72	0.013	112.20	111.90	546	0.0005	3.52	64.2	0.0008	25% xval-x	0.29	45.13	0.30	59.21	0.32	63.02	0.32	64.46	0.24	9	2050	0.30	0.30	0.00	0.00	ignore
RE*AUBURN1	R18H-14	R18H-13	72	0.013	111.90	111.50	540	0.0007	4.09	74.6	0.0008	0%		45.13		59.21		63.02		64.46	-10.10	OK	NE					
RE*AUBURN1	R18H-13	R18H-12	72	0.013	111.50	111.00	530	0.0009	4.61	84.1	0.0008	0%		45.13		59.21		63.02		64.46	-19.69	OK	NE					
RE*AUBURN1	R18H-12	R18H-11	72	0.013	111.00	110.50	655	0.0008	4.15	75.7	0.0008	0%		45.13		59.21		63.02		64.46	-11.24	OK	NE					
RE*AUBURN1	R18H-11	R18H-10	72	0.013	110.50	110.00	640	0.0008	4.20	76.6	0.0008	0%		45.13		59.21		63.02		64.46	-12.12	OK	NE					
RE*AUBURN1	R18H-10	R18H-09	72	0.013	110.00	109.60	398	0.0010	4.76	86.9	0.0008	0%		45.13		59.21		63.02		64.46	-22.40	OK	NE					
RE*AUBURN1	R18H-09	R18H-08	72	0.013	109.60	109.40	112	0.0018	6.35	115.8	0.0008	100% xval-s	0.41	45.54	0.43	59.65	0.46	63.48	0.46	64.92	-50.85	OK	NE	0.06	0.20	0.14	0.09	

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
RE*AUBURN1	R18H-08	R18H-07	72	0.013	109.40	109.10	629	0.0005	3.28	59.8	0.0008	0%		45.54		59.65		63.48		64.92	5.09	27	2030	0.35	0.30	-0.05	-0.05	ignore
RE*AUBURN1	R18H-07	R18H-06	72	0.013	109.10	108.60	629	0.0008	4.23	77.2	0.0008	0%		45.54		59.65		63.48		64.92	-12.32	OK	NE					
RE*AUBURN1	R18H-06	R18H-05	72	0.013	108.60	108.00	534	0.0011	5.03	91.8	0.0008	0%		45.54		59.65		63.48		64.92	-26.91	OK	NE					
RE*AUBURN1	R18H-05	R18H-04	72	0.013	108.00	107.50	565	0.0009	4.47	81.5	0.0008	0%		45.54		59.65		63.48		64.92	-16.58	OK	NE					
RE*AUBURN1	R18H-04	R18H-03	72	0.013	107.50	107.20	494	0.0006	3.70	67.5	0.0008	0%		45.54		59.65		63.48		64.92	-2.60	OK	NE					
RE*AUBURN1	R18H-03	R18H-02	72	0.013	107.20	106.80	520	0.0008	4.17	76.0	0.0008	0%		45.54		59.65		63.48		64.92	-11.07	OK	NE					
RE*AUBURN1	R18H-02	R18H-01	72	0.013	106.80	106.40	520	0.0008	4.17	76.0	0.0008	0%		45.54		59.65		63.48		64.92	-11.07	OK	NE					
	Section		72	0.013		8.10	10025	0.0008	4.27	77.9	0.0008	0%		45.54		59.65		63.48		64.92	-12.96	OK	NE					OK
% TO SOUTH INTERCEPTOR												-50% AUBURN1	-22.77	22.77	-29.82	29.82	-31.74	31.74	-32.46	32.46			X					
RE*AUBURN1	R18H-01	R18G-01A	60	0.013	106.40	105.90	36	0.0139	15.67	198.6	0.0026	25% xval-x	0.29	23.06	0.30	30.13	0.32	32.06	0.32	32.78	-165.77	OK	NE					
RE*KENTX	R18G-01A	R18G-01	72	0.013	104.00	103.80	635	0.0003	2.67	48.6	0.0026	0%		23.06		30.13		32.06		32.78	-15.84	OK	NE					
RE*KENTX	R18G-01	52	72	0.013	103.80	103.70	353	0.0003	2.53	46.1	0.0026	0%		23.06		30.13		32.06		32.78	-13.33	OK	NE					
	Section		72	0.013		2.70	1024	0.0026	7.71	140.7	0.0026	0%		23.06		30.13		32.06		32.78	-107.90	OK	NE					OK
TO ULID1/5#52																												

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera: New Slope	Modification: Origin of Flow Percent	2010 Design Flow: Inflow (MGD)	2010 Design Flow: Total (MGD)	2020 Design Flow: Inflow (MGD)	2020 Design Flow: Total (MGD)	2030 Design Flow: Inflow (MGD)	2030 Design Flow: Total (MGD)	2050 Design Flow: Inflow (MGD)	2050 Design Flow: Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev": Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
RE*WHILL	15	14	24	0.013	155.30	153.30	221	0.0090	6.87	13.9	0.0055	100% whill-x	6.23	6.23	7.62	7.62	8.09	8.09	8.20	8.20	-5.72	OK	NE					
RE*WHILL	14	13	24	0.013	153.30	146.20	249	0.0285	12.19	24.7	0.0055	0%		6.23		7.62		8.09		8.20	-16.51	OK	NE	0.78	7.10	6.32	5.32	
RE*WHILL	13	12	24	0.013	146.20	145.40	286	0.0028	3.82	7.7	0.0055	0%		6.23		7.62		8.09		8.20	0.46	9	2030	0.89	0.80	-0.09	-1.00	ignore
RE*WHILL	12	11	24	0.013	145.40	144.60	514	0.0016	2.85	5.8	0.0055	0%		6.23		7.62		8.09		8.20	2.43	15	2010	1.61	0.80	-0.81	-0.90	ignore
RE*WHILL	11	10	24	0.013	144.60	144.40	95	0.0021	3.31	6.7	0.0055	0%		6.23		7.62		8.09		8.20	1.48	12	2020	0.30	0.20	-0.10	-0.10	ignore
RE*WHILL	10	09	24	0.013	144.40	143.50	222	0.0041	4.60	9.3	0.0055	0%		6.23		7.62		8.09		8.20	-1.12	OK	NE					
RE*WHILL	09	08	24	0.013	143.50	142.30	305	0.0039	4.53	9.2	0.0055	0%		6.23		7.62		8.09		8.20	-0.98	OK	NE					
RE*WHILL	08	07	24	0.013	142.30	140.00	344	0.0067	5.90	12.0	0.0055	0%		6.23		7.62		8.09		8.20	-3.77	OK	NE					
RE*WHILL	07	06A	24	0.013	140.00	131.20	500	0.0176	9.58	19.4	0.0055	0%		6.23		7.62		8.09		8.20	-11.21	OK	NE					
RE*WHILL	06A	06B	24	0.013	131.20	131.10	15	0.0067	5.90	11.9	0.0055	-60% whill-x	-3.74	2.49	-4.57	3.05	-4.85	3.24	-4.92	3.28	-8.67	OK	NE					
RE*WHILL	06B	06	24	0.013	131.10	130.40	335	0.0021	3.30	6.7	0.0055	0%		2.49		3.05		3.24		3.28	-3.41	OK	NE					
RE*WHILL	06	05	24	0.013	130.40	129.70	350	0.0020	3.23	6.5	0.0055	0%		2.49		3.05		3.24		3.28	-3.26	OK	NE					
RE*WHILL	05	04	24	0.013	129.70	128.70	500	0.0020	3.23	6.5	0.0055	0%		2.49		3.05		3.24		3.28	-3.26	OK	NE					
RE*WHILL	04	03	24	0.013	128.70	127.90	410	0.0020	3.19	6.5	0.0055	0%		2.49		3.05		3.24		3.28	-3.18	OK	NE					
RE*WHILL	03	02	24	0.013	128.90	127.00	413	0.0046	4.90	9.9	0.0055	0%		2.49		3.05		3.24		3.28	-6.65	OK	NE					
RE*WHILL	02	01A	24	0.013	127.00	126.50	240	0.0021	3.29	6.7	0.0055	5% ulid4-x	0.12	2.61	0.13	3.18	0.14	3.38	0.14	3.42	-3.25	OK	NE					
RE*WHILL	01A	01	24	0.013	126.50	126.40	96	0.0010	2.33	4.7	0.0055	0% whill-x		2.61		3.18		3.38		3.42	-1.30	OK	NE					
RE*WHILL	01	S-31A	24	0.013	126.40	125.70	40	0.0175	9.55	19.4	0.0055	0%		2.61		3.18		3.38		3.42	-15.94	OK	NE					
RE*WHILL	S-31A	S-31B	24	0.013	125.70	125.50	294	0.0007	1.88	3.8	0.0055	0%		2.61		3.18		3.38		3.42	-0.39	OK	NE					
	Section		24	0.013		29.80	5429	0.0055	5.35	10.8	0.0055	0%		2.61		3.18		3.38		3.42	-7.42	OK	NE					OK
RE*WHILL	S-31B	S-31	24	0.013	125.50	122.30	14	0.2286	34.52	70.0	0.2286	0%		2.61		3.18		3.38		3.42	-66.54	OK	NE					
RE*ULID1/4	S-31	S-30	24	0.013	122.30	121.50	448	0.0018	3.05	6.2	0.0013	0%		2.61		3.18		3.38		3.42	-2.76	OK	NE					
RE*ULID1/4	S-30	S-29	24	0.013	121.50	120.00	454	0.0033	4.15	8.4	0.0013	5% ulid4-x	0.12	2.73	0.13	3.32	0.14	3.52	0.14	3.57	-4.84	OK	NE	0.27	1.50	1.23	1.07	
RE*ULID1/4	S-29	S-28	24	0.013	120.00	119.90	443	0.0002	1.09	2.2	0.0013	0%		2.73		3.32		3.52		3.57	1.37	15	2010	0.26	0.10	-0.16	-0.16	ignore
RE*ULID1/4	S-28	S-27	24	0.013	119.90	119.10	446	0.0018	3.06	6.2	0.0013	30% ulid4-x	0.70	3.43	0.81	4.13	0.86	4.38	0.87	4.44	-1.76	OK	NE					
RE*ULID1/4	S-27	S-26	24	0.013	119.10	118.10	463	0.0022	3.35	6.8	0.0013	0%		3.43		4.13		4.38		4.44	-2.36	OK	NE					
RE*ULID1/4	S-26	S-25	24	0.013	118.10	117.30	405	0.0020	3.21	6.5	0.0013	0%		3.43		4.13		4.38		4.44	-2.07	OK	NE					
RE*ULID1/4	S-25	S-24	24	0.013	117.30	116.70	285	0.0021	3.31	6.7	0.0013	0%		3.43		4.13		4.38		4.44	-2.28	OK	NE					
RE*ULID1/4	S-24	S-23	24	0.013	116.70	115.90	353	0.0023	3.44	7.0	0.0013	0%		3.43		4.13		4.38		4.44	-2.53	OK	NE					
	Section		24	0.013		6.40	3297	0.0019	3.18	6.4	0.0019	0%		3.43		4.13		4.38		4.44	-2.01	OK	NE					OK
RE*ULID1/4	S-23	S-22	30	0.013	115.90	115.30	348	0.0017	3.48	11.0	0.0013	15% ulid4-x	0.35	3.78	0.40	4.53	0.43	4.81	0.43	4.87	-6.15	OK	NE					
RE*ULID1/4	S-22	S-20	30	0.013	115.30	115.00	409	0.0007	2.27	7.2	0.0013	0%		3.78		4.53		4.81		4.87	-2.32	OK	NE					
RE*ULID1/4	S-20	S-19	30	0.013	115.00	114.70	320	0.0009	2.56	8.1	0.0013	0%		3.78		4.53		4.81		4.87	-3.25	OK	NE					
RE*ULID1/4	S-19	S-18	30	0.013	114.70	114.50	201	0.0010	2.64	8.4	0.0013	20% 250s-x	0.66	4.45	0.80	5.33	0.85	5.66	0.86	5.73	-2.64	OK	NE					
RE*ULID1/4	S-18	S-17	30	0.013	114.50	114.20	185	0.0016	3.37	10.7	0.0013	0%		4.45		5.33		5.66		5.73	-4.96	OK	NE					
	Section		30	0.013		1.70	1463	0.0012	2.86	9.0	0.0012	0%		4.45		5.33		5.66		5.73	-3.32	OK	NE					OK
RE*ULID250	S-17	S-16	30	0.013	114.20	114.00	290	0.0007	2.20	7.0	0.0013	0%		4.45		5.33		5.66		5.73	-1.24	OK	NE					
RE*ULID250	S-16	S-15A	30	0.013	114.00	113.60	500	0.0008	2.37	7.5	0.0013	0%		4.45		5.33		5.66		5.73	-1.78	OK	NE					
RE*ULID250	S-15	S-14	30	0.013	113.60	113.10	502	0.0010	2.64	8.4	0.0013	0%		4.45		5.33		5.66		5.73	-2.65	OK	NE					
RE*ULID250	S-14	S-13	30	0.013	113.10	112.60	500	0.0010	2.65	8.4	0.0013	0%		4.45		5.33		5.66		5.73	-2.67	OK	NE					
RE*ULID250	S-13	S-12	30	0.013	112.60	112.20	500	0.0008	2.37	7.5	0.0013	0%		4.45		5.33		5.66		5.73	-1.78	OK	NE					
RE*ULID250	S-12	S-11	30	0.013	112.20	111.40	324	0.0025	4.16	13.2	0.0013	0%		4.45		5.33		5.66		5.73	-7.46	OK	NE	0.15	0.80	0.65	0.55	
RE*ULID250	S-11	S-10	30	0.013	111.40	111.30	440	0.0002	1.26	4.0	0.0013	0%		4.45		5.33		5.66		5.73	1.73	18	2010	0.20	0.10	-0.10	-0.10	ignore
	Section		30	0.013		2.90	3056	0.0009	2.58	8.2	0.0009	0%		4.45		5.33		5.66		5.73	-2.45	OK	NE					OK
RE*ULID250	S-10	S-09	36	0.013	111.30	111.10	445	0.0004	2.01	9.1	0.0013	0%		4.45		5.33		5.66		5.73	-3.42	OK	NE					
RE*ULID250	S-09	S-08	36	0.013	111.10	110.90	446	0.0004	2.00	9.1	0.0013	0%		4.45		5.33		5.66		5.73	-3.41	OK	NE					
RE*ULID250	S-08	S-07	36	0.013	110.90	110.80	350	0.0003	1.60	7.3	0.0013	0%		4.45		5.33		5.66		5.73	-1.56	OK	NE					
RE*ULID250	S-07	S-06	36	0.013	110.80	110.50	497	0.0006	2.32	10.6	0.0013	0%		4.45		5.33		5.66		5.73	-4.87	OK	NE					
	Section*		36	0.013		0.80	1738	0.0005	2.03	9.3	0.0005	0%		4.45		5.33		5.66		5.73	-3.53	OK	NE					
RE*ULID250	S-06	S-05	36	0.013	110.50	110.20	305	0.0010	2.97	13.5	0.0013	0%		4.45		5.33		5.66		5.73	-7.80	OK	NE					
RE*ULID250	S-05	S-04A	36	0.013	110.20	110.10	255	0.0004	1.87	8.5	0.0013	0%		4.45		5.33		5.66		5.73	-2.81	OK	NE					
RE*ULID250	S-04A	S-03	36	0.013	110.10	109.60	430	0.0012	3.23	14.7	0.0013	80% 250s-x	2.66	7.10	3.22	8.55	3.40	9.06	3.43	9.16	-5.56	OK	NE					
RE*ULID250	S-03	S-02	36	0.013	109.60	109.00	432	0.0014	3.53	16.1	0.0013	0%		7.10		8.55		9.06		9.16	-6.92	OK	NE					
RE*ULID250	S-02	S-01	36	0.013	109.00	108.40	455	0.0013	3.44	15.7	0.0013	0%		7.10		8.55		9.06		9.16	-6.51	OK	NE					
RE*ULID250	S-01	N-01	36	0.013	108.40	107.80	503	0.0012	3.27	14.9	0.0013	0%		7.10		8.55		9.06		9.16	-5.74	OK	NE					
RE*ULID250	N-01	N-02	36	0.013	107.80	105.90	525	0.0036	5.69	26.0	0.0036	0%		7.10		8.55		9.06		9.16	-16.80	OK	NE					
	Section*		36	0.013		4.60	2905	0.0016	3.76	17.2	0.0016	0%		7.10		8.55		9.06		9.16	-8.01	OK	NE					OK
TO ULID 250 #N-02																												

Task 240 Report: KENT PLANNING ZONE - REROUTING ALTERNATIVE											Herrera	Modification	2010 Design Flow		2020 Design Flow		2030 Design Flow		2050 Design Flow					Surcharge: any negative value in "BW elev"				
FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	New Slope	Origin of Flow Percent	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Inflow (MGD)	Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
RE*ULID250	N-06G	N-06F	15	0.013	113.70	112.50	151	0.0079	4.70	3.7	0.0017	80% 250n-x	3.41	3.41	5.08	5.08	5.37	5.37	5.39	5.39	1.67	15	2020					
RE*ULID250	N-06F	N-06E	27	0.013	112.50	110.70	455	0.0040	4.91	12.6	0.0017	0%		3.41		5.08		5.37		5.39	-7.21	OK	NE					
RE*ULID250	N-06E	N-06D	27	0.013	110.70	108.40	451	0.0051	5.58	14.3	0.0017	10% 250n-x	0.43	3.84	0.63	5.71	0.67	6.04	0.67	6.06	-8.25	OK	NE					
Section			27	0.013		5.30	1057	0.0050	5.53	14.2	0.0050	0%		3.84		5.71		6.04		6.06	-8.13	OK	NE					OK
RE*ULID250	N-06D	N-06C	36	0.013	108.40	108.20	387	0.0005	2.15	9.8	0.0017	0%		3.84		5.71		6.04		6.06	-3.74	OK	NE					
RE*ULID250	N-06C	N-06B	36	0.013	108.20	108.10	282	0.0004	1.78	8.1	0.0017	0%		3.84		5.71		6.04		6.06	-2.06	OK	NE					
RE*ULID250	N-06B	N-06A	36	0.013	108.10	107.90	327	0.0006	2.34	10.7	0.0017	0%		3.84		5.71		6.04		6.06	-4.61	OK	NE					
RE*ULID250	N-06A	N-06	36	0.013	107.90	107.80	422	0.0002	1.46	6.6	0.0017	0%		3.84		5.71		6.04		6.06	-0.58	OK	NE					
RE*ULID250	N-06	N-05	36	0.013	107.80	107.70	180	0.0006	2.23	10.2	0.0017	0%		3.84		5.71		6.04		6.06	-4.11	OK	NE					
RE*ULID250	N-05	N-04	36	0.013	107.70	107.40	423	0.0007	2.52	11.5	0.0017	10% 250n-x	0.43	4.26	0.63	6.35	0.67	6.71	0.67	6.74	-4.76	OK	NE					
RE*ULID250	N-04	N-03	36	0.013	107.40	107.20	441	0.0005	2.01	9.2	0.0017	0%		4.26		6.35		6.71		6.74	-2.45	OK	NE					
RE*ULID250	N-03	N-02A	36	0.013	107.20	107.10	287	0.0003	1.77	8.1	0.0017	0%		4.26		6.35		6.71		6.74	-1.32	OK	NE					
Section*			36	0.013		1.30	2749	0.0005	2.06	9.4	0.0005	0%		4.26		6.35		6.71		6.74	-2.65	OK	NE					OK
RE*ULID250	N-02A	N-02	36	0.013	107.10	105.90	135	0.0089	8.92	40.7	0.0089	100% ULID250S	7.10	11.37	8.55	14.89	9.06	15.77	9.16	15.89	-24.78	OK	NE					
Section*			36	0.013		1.20	135	0.0089	8.92	40.7	0.0089	0%		11.37		14.89		15.77		15.89	-24.78	OK	NE					OK
RE*KENTX	R18G-07	R18G-06	54	0.013	106.00	105.60	625	0.0006	3.14	32.2	0.0006	25% xval-x	0.29	11.65	0.30	15.20	0.32	16.09	0.32	16.22	-15.96	OK	NE					
RE*KENTX	R18G-06	R18G-05	54	0.013	105.60	105.20	618	0.0006	3.15	32.4	0.0006	0%		11.65		15.20		16.09		16.22	-16.15	OK	NE					
RE*KENTX	R18G-05	R18G-04	54	0.013	105.20	105.40	74	-0.0027			0.0006	0%		11.65		15.20		16.09		16.22	16.22	42	2010					
RE*KENTX	R18G-04	R18G-03	54	0.013	105.40	105.00	619	0.0006	3.15	32.3	0.0006	0%		11.65		15.20		16.09		16.22	-16.12	OK	NE					OK
RE*KENTX to SI	R18G-03	R18A-57	54	0.013	105.00	104.10	664	0.0014	4.56	46.8	0.0014	0%		11.65		15.20		16.09		16.22	-30.62	OK	NE					
Section			54	0.013		1.90	2600	0.0007	3.35	34.4	0.0007	0%		11.65		15.20		16.09		16.22	-18.17	OK	NE					OK
TO SOUTH INTERCEPTOR																												

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ–Δfull	BW (ft)	Proposed Diameter (inches)
												8% mill-x	0.93	0.93	1.07	1.07	1.14	1.14	1.18	1.18	1.18	#DIV/0!						
RE*GARISN	R18-30	R18-29	24	0.013	378.04	377.67	110	0.0034	4.18	8.5	0.0034	55% gar-x	3.27	4.20	3.97	5.04	4.22	5.36	4.35	5.53	-2.95	OK	NE					
RE*GARISN	R18-29	R18-28	12	0.013	377.67	347.35	206	0.1472	17.46	8.8	0.1472	0%		4.20		5.04		5.36		5.53	-3.32	OK	NE					
RE*GARISN	R18-28	R18-27	12	0.013	347.35	326.23	195	0.1083	14.97	7.6	0.1083	0%		4.20		5.04		5.36		5.53	-2.06	OK	NE					
RE*GARISN	R18-27	R18-26	12	0.013	326.23	302.19	152	0.1580	18.08	9.2	0.1580	2% gar-x	0.12	4.32	0.14	5.18	0.15	5.52	0.16	5.68	-3.48	OK	NE					
RE*GARISN	R18-26	R18-25	12	0.013	302.19	276.30	335	0.0773	12.64	6.4	0.0052	0%		4.32		5.18		5.52		5.68	-0.72	OK	NE	20.30	25.89	5.59	5.02	
Section			12	0.013		101.74	999	0.1019	14.51	7.4	0.0052	0%		4.32		5.18		5.52		5.68	-1.67	OK	NE					OK
RE*GARISN	R18-25	R18-24	18	0.013	275.59	273.89	325	0.0052	4.31	4.9	0.0051	0%		4.32		5.18		5.52		5.68	0.78	12	2020	2.27	1.70	-0.57	-1.26	
RE*GARISN	R18-24	R18-23	18	0.013	273.89	272.28	330	0.0049	4.16	4.7	0.0051	0%		4.32		5.18		5.52		5.68	0.94	12	2020	2.30	1.61	-0.69	-0.69	
Section			18	0.013		3.31	655	0.0051	4.24	4.8	0.0051	0%		4.32		5.18		5.52		5.68	0.85	12	2020					12
RE*GARISN	R18-23	R18-22	12	0.013	272.28	254.65	235	0.0751	12.47	6.3	0.0751	5% gar-x	0.30	4.62	0.36	5.54	0.38	5.90	0.40	6.08	-0.24	OK	NE					
RE*GARISN	R18-22	R18-21	12	0.013	254.65	223.41	210	0.1488	17.55	8.9	0.1488	7% gar-x	0.42	5.04	0.50	6.05	0.54	6.44	0.55	6.63	-2.26	OK	NE					
RE*GARISN	R18-21	R18-20	12	0.013	219.39	202.44	69	0.2459	22.55	11.4	0.2459	0%		5.04		6.05		6.44		6.63	-4.79	OK	NE					
RE*GARISN	R18-20	R18-19	12	0.013	202.44	190.27	97	0.1250	16.08	8.1	0.1250	0%		5.04		6.05		6.44		6.63	-1.51	OK	NE	8.03	12.17	4.14	1.22	
Section			12	0.013		82.01	611	0.1342	16.67	8.4	0.1342	0%		5.04		6.05		6.44		6.63	-1.81	OK	NE					OK
RE*GARISN	R18-19	R18-18	15	0.013	190.27	188.11	202	0.0107	5.45	4.3	0.0107	0%		5.04		6.05		6.44		6.63	2.32	12	2010	5.08	2.16	-2.92	-2.92	12
RE*GARISN @ creek	R18-18	R18-17	15	0.013	188.11	171.18	356	0.0475	11.51	9.1	0.0475	0%		5.04		6.05		6.44		6.63	-2.48	OK	NE					
Section			15	0.013		19.09	559	0.0342	9.75	7.7	0.0342	0%		5.04		6.05		6.44		6.63	-1.09	OK	NE					OK
RE*GARISN @ creek drop	R18-17	R18-15	18	0.013	167.15	165.29	386	0.0048	4.14	4.7	0.0048	0%		5.04		6.05		6.44		6.63	1.92	15	2010	3.67	1.86	-1.81	-3.07	15
RE*GARISN @ creek	R18-15	R18-14	18	0.013	165.29	163.34	339	0.0058	4.52	5.2	0.0058	0%		5.04		6.05		6.44		6.63	1.48	12	2020	3.22	1.95	-1.27	-1.27	15
RE*GARISN @ creek	R18-14	R18-13	18	0.013	163.34	162.29	66	0.0159	7.51	8.6	0.0159	20% gar-x	1.19	6.23	1.44	7.49	1.54	7.97	1.58	8.21	-0.35	OK	NE					
Section			18	0.013		4.86	791	0.0061	4.67	5.3	0.0061	0%		6.23		7.49		7.97		8.21	2.89	15	2010					ok
RE*GARISN	R18-13	R18-12A	24	0.013	161.70	161.47	101	0.0023	3.44	7.0	0.0023	0%		6.23		7.49		7.97		8.21	1.24	15	2020	0.32	0.23	-0.09	-0.71	
RE*GARISN	R18-12A	R18-12	24	0.013	161.47	161.21	155	0.0017	2.96	6.0	0.0017	0%		6.23		7.49		7.97		8.21	2.22	18	2010	0.49	0.26	-0.23	-0.62	
RE*GARISN	R18-12	R18-11	24	0.013	161.21	160.79	259	0.0016	2.91	5.9	0.0016	0%		6.23		7.49		7.97		8.21	2.32	18	2010	0.81	0.42	-0.39	-0.39	
Section			24	0.013		0.91	515	0.0018	3.04	6.2	0.0018	0%		6.23		7.49		7.97		8.21	2.06	18	2010					ok
RE*GARISN	R18-11	R18-10	18	0.013	160.79	130.78	356	0.0842	17.30	19.7	0.0842	11% gar-x	0.65	6.88	0.79	8.28	0.84	8.82	0.87	9.08	-10.64	OK	NE	6.34	30.01	23.67	22.50	
RE*GARISN drop	R18-10	R18-09	18	0.013	118.98	115.51	260	0.0133	6.88	7.8	0.0133	0%		6.88		8.28		8.82		9.08	1.24	12	2020	4.64	3.47	-1.17	-1.17	ignore
Section			18	0.013		45.28	617	0.0734	16.15	18.4	0.0133	0%		6.88		8.28		8.82		9.08	-9.33	OK	NE					OK
RE*GARISN	R18-09	R18-08	24	0.013	115.51	115.09	420	0.0010	2.29	4.6	0.0012	34% c5e-x	0.44	7.32	0.49	8.78	0.52	9.34	0.53	9.61	4.98	24	2010					
RE*GARISN	R18-08	R18-07	24	0.013	115.09	114.54	413	0.0013	2.64	5.3	0.0012	0%		7.32		8.78		9.34		9.61	4.27	24	2010					
RE*GARISN	R18-07	R18-06	24	0.013	114.54	114.29	94	0.0027	3.72	7.5	0.0012	0%		7.32		8.78		9.34		9.61	2.07	18	2020					
RE*GARISN	R18-06	R18-04	24	0.013	114.29	114.42	134	-0.0010			0.0012	0%		7.32		8.78		9.34		9.61	9.61	33	2010					
RE*GARISN	R18-04	R18-03	24	0.013	114.42	113.88	418	0.0013	2.59	5.3	0.0012	0%		7.32		8.78		9.34		9.61	4.35	24	2010					
RE*GARISN	R18-03	R18-02A	24	0.013	113.84	113.39	350	0.0013	2.59	5.2	0.0012	0%		7.32		8.78		9.34		9.61	4.37	24	2010					
RE*GARISN	R18-02A	R18-02	24	0.013	113.39	113.29	96	0.0010	2.33	4.7	0.0012	0%		7.32		8.78		9.34		9.61	4.89	24	2010					
RE*GARISN	R18-02	R18-01	24	0.013	113.29	112.63	365	0.0018	3.07	6.2	0.0012	33% c5e-x	0.43	7.75	0.48	9.26	0.51	9.85	0.51	10.13	3.90	24	2010					
RE*GARISN	R18-01	R18-57I-A	24	0.013	112.63	112.50	306	0.0004	1.49	3.0	0.0012	0%		7.75		9.26		9.85		10.13	7.11	30	2010					
RE*GARISN	R18-57I-A	57I	24	0.013	112.50	112.40	19	0.0053	5.24	10.6	0.0012	0%		7.75		9.26		9.85		10.13	-0.49	OK	NE					
Section			24	0.013		3.11	2614	0.0012	2.49	5.0	0.0133	0%		7.75		9.26		9.85		10.13	5.08	18	2010					18
RE*ULID1/5	57I	57H	24	0.013	112.40	112.00	404	0.0010	2.27	4.6	0.0018	0%		7.75		9.26		9.85		10.13	5.52	24	2010					
RE*ULID1/5	57H	57G	24	0.013	112.00	111.50	403	0.0012	2.54	5.2	0.0018	0%		7.75		9.26		9.85		10.13	4.97	24	2010					
RE*ULID1/5	57G	57F	24	0.013	111.50	111.00	351	0.0014	2.72	5.5	0.0018	33% c5e-x	0.43	8.18	0.48	9.74	0.51	10.36	0.51	10.64	5.12	24	2010					
RE*ULID1/5	57F	57E	24	0.013	111.00	110.60	350	0.0011	2.44	4.9	0.0018	0%		8.18		9.74		10.36		10.64	5.69	24	2010					
RE*ULID1/5	57E	57D	24	0.013	110.60	110.00	400	0.0015	2.80	5.7	0.0018	0%		8.18		9.74		10.36		10.64	4.97	24	2010					
RE*ULID1/5	57D	57C	24	0.013	110.00	109.40	400	0.0015	2.80	5.7	0.0018	0%		8.18		9.74		10.36		10.64	4.97	24	2010					
RE*ULID1/5	57C	57B	24	0.013	109.40	109.30	130	0.0008	2.00	4.1	0.0018	0%		8.18		9.74		10.36		10.64	6.58	27	2010					
RE*ULID1/5	57B	57AA	24	0.013	109.30	108.90	217	0.0018	3.10	6.3	0.0018	0%		8.18		9.74		10.36		10.64	4.35	24	2010					
RE*ULID1/5	57AA	57A	24	0.013	108.90	108.50	268	0.0015	2.79	5.7	0.0018	0%		8.18		9.74		10.36		10.64	4.99	24	2010					
RE*ULID1/5	57A	57	24	0.013	108.50	106.40	500	0.0042	4.68	9.5	0.0018	0%		8.18		9.74		10.36		10.64	1.15	15	2020					
Section			24	0.013		6.00	3423	0.0018	3.02	6.1	0.0018	0%		8.18		9.74		10.36		10.64	4.51	24	2010					24
TO ULID 1/5.#57																												

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera New Slope	Modification Origin of Flow Percent	2010 Design Flow Inflow (MGD)	2010 Design Flow Total (MGD)	2020 Design Flow Inflow (MGD)	2020 Design Flow Total (MGD)	2030 Design Flow Inflow (MGD)	2030 Design Flow Total (MGD)	2050 Design Flow Inflow (MGD)	2050 Design Flow Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev" Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
do not delete this line												25% mill-x	2.90	2.90	3.34	3.34	3.57	3.57	3.68	3.68			X					
RE*MILL	R18F-37A	R18F-37	27	0.013	444.60	442.00	440	0.0059	6.00	15.4	0.0149	100% mill-e	2.58	5.48	3.36	6.70	3.61	7.18	3.78	7.46	-7.94	OK	NE					
RE*MILL	R18F-37	R18F-36	21	0.013	442.00	434.70	428	0.0171	8.63	13.4	0.0149	0%		5.48		6.70		7.18		7.46	-5.92	OK	NE					
RE*MILL	R18F-36	R18F-35	21	0.013	434.70	428.90	335	0.0173	8.69	13.5	0.0149	0%		5.48		6.70		7.18		7.46	-6.03	OK	NE					
RE*MILL	R18F-35	R18F-34	21	0.013	428.90	423.00	340	0.0174	8.70	13.5	0.0149	0%		5.48		6.70		7.18		7.46	-6.04	OK	NE					
RE*MILL	R18F-34	R18F-33	21	0.013	423.00	417.00	358	0.0168	8.55	13.3	0.0149	0%		5.48		6.70		7.18		7.46	-5.81	OK	NE					
RE*MILL	R18F-33	R18F-32	21	0.013	417.00	411.00	358	0.0168	8.55	13.3	0.0149	0%		5.48		6.70		7.18		7.46	-5.81	OK	NE					
	Section		21	0.013		33.60	2259	0.0149	8.06	12.5	0.0149	0%		5.48		6.70		7.18		7.46	-5.04	OK	NE					OK
RE*MILL	R18F-32	R18F-31	24	0.013	411.00	408.50	408	0.0061	5.65	11.5	0.0060	0%		5.48		6.70		7.18		7.46	-4.00	OK	NE					
RE*MILL	R18F-31	R18F-30	24	0.013	408.50	406.70	307	0.0059	5.53	11.2	0.0060	0%		5.48		6.70		7.18		7.46	-3.74	OK	NE					
RE*MILL	R18F-30	R18F-29	24	0.013	406.70	404.80	320	0.0059	5.56	11.3	0.0060	0%		5.48		6.70		7.18		7.46	-3.81	OK	NE					
	Section		24	0.013		6.20	1035	0.0060	5.59	11.3	0.0060	0%		5.48		6.70		7.18		7.46	-3.87	OK	NE					OK
RE*MILL	R18F-29	R18F-28	21	0.013	404.80	400.50	359	0.0120	7.23	11.2	0.0519	12% mill-x	1.39	6.87	1.61	8.31	1.71	8.89	1.77	9.23	-1.99	OK	NE					
RE*MILL	R18F-28	R18F-27A	18	0.013	400.50	391.80	231	0.0377	11.57	13.2	0.0519	0%		6.87		8.31		8.89		9.23	-3.96	OK	NE					
RE*MILL	R18F-27A	R18F-27	18	0.013	391.80	388.20	80	0.0450	12.64	14.4	0.0519	0%		6.87		8.31		8.89		9.23	-5.18	OK	NE					
RE*MILL	R18F-27	R18F-26	18	0.013	388.20	371.10	379	0.0451	12.66	14.4	0.0519	0%		6.87		8.31		8.89		9.23	-5.20	OK	NE					
RE*MILL	R18F-26	R18F-25	18	0.013	371.10	348.40	367	0.0619	14.82	16.9	0.0519	0%		6.87		8.31		8.89		9.23	-7.67	OK	NE					
RE*MILL	R18F-25	R18F-24	18	0.013	348.40	334.30	318	0.0443	12.55	14.3	0.0519	0%		6.87		8.31		8.89		9.23	-5.08	OK	NE					
RE*MILL	R18F-24	R18F-23	18	0.013	334.30	309.00	405	0.0625	14.90	17.0	0.0519	0%		6.87		8.31		8.89		9.23	-7.76	OK	NE					
RE*MILL	R18F-23	R18F-22	18	0.013	309.00	278.20	395	0.0780	16.64	19.0	0.0519	0%		6.87		8.31		8.89		9.23	-9.74	OK	NE					
RE*MILL	R18F-22	R18F-21	18	0.013	278.20	263.00	195	0.0779	16.64	19.0	0.0519	0%		6.87		8.31		8.89		9.23	-9.74	OK	NE					
RE*MILL	R18F-21	R18F-20A	18	0.013	263.00	256.80	165	0.0376	11.56	13.2	0.0519	0%		6.87		8.31		8.89		9.23	-3.94	OK	NE					
RE*MILL	R18F-20A	R18F-20	18	0.013	256.80	252.30	90	0.0500	13.33	15.2	0.0519	0%		6.87		8.31		8.89		9.23	-5.96	OK	NE					
RE*MILL	R18F-20	R18F-19	18	0.013	252.30	238.80	292	0.0462	12.82	14.6	0.0519	0%		6.87		8.31		8.89		9.23	-5.38	OK	NE					
RE*MILL	R18F-19	R18F-18	18	0.013	238.80	216.90	347	0.0631	14.97	17.1	0.0519	0%		6.87		8.31		8.89		9.23	-7.84	OK	NE					
	Section		18	0.013		187.90	3623	0.0519	13.58	15.5	0.0519	0%		6.87		8.31		8.89		9.23	-6.25	OK	NE					OK
RE*MILL	R18F-18	R18F-17	21	0.013	216.90	213.00	290	0.0134	7.66	11.9	0.0442	0%		6.87		8.31		8.89		9.23	-2.65	OK	NE					
RE*MILL	R18F-17	R18F-16A	18	0.013	213.00	184.00	447	0.0649	15.18	17.3	0.0442	0%		6.87		8.31		8.89		9.23	-8.08	OK	NE					
RE*MILL	R18F-16A	R18F-16	18	0.013	184.00	182.70	14	0.0929	18.16	20.7	0.0442	0%		6.87		8.31		8.89		9.23	-11.48	OK	NE					
RE*MILL	R18F-16	R18F-15	18	0.013	182.70	174.60	118	0.0686	15.62	17.8	0.0442	0%		6.87		8.31		8.89		9.23	-8.58	OK	NE					
	Section		18	0.013		38.40	869	0.0442	12.53	14.3	0.0442	0%		6.87		8.31		8.89		9.23	-5.05	OK	NE					OK
RE*MILL	R18F-15	R18F-14	24	0.013	174.60	172.20	380	0.0063	5.74	11.6	0.0347	0%		6.87		8.31		8.89		9.23	-2.40	OK	NE					
RE*MILL	R18F-14	R18F-13	18	0.013	172.20	168.20	143	0.0280	9.97	11.4	0.0347	0%		6.87		8.31		8.89		9.23	-2.14	OK	NE					
RE*MILL	R18F-13	R18F-12	18	0.013	168.20	164.10	140	0.0293	10.20	11.6	0.0347	0%		6.87		8.31		8.89		9.23	-2.40	OK	NE					
RE*MILL	R18F-12	R18F-11	18	0.013	164.10	154.80	149	0.0624	14.89	17.0	0.0347	0%		6.87		8.31		8.89		9.23	-7.74	OK	NE					
RE*MILL	R18F-11	R18F-10	18	0.013	154.80	136.20	295	0.0631	14.97	17.1	0.0347	0%		6.87		8.31		8.89		9.23	-7.83	OK	NE					
	Section		18	0.013		38.40	1107	0.0347	11.10	12.7	0.0347	0%		6.87		8.31		8.89		9.23	-3.43	OK	NE					OK
RE*MILL	R18F-10	R18F-09	21	0.013	136.20	126.30	439	0.0226	9.92	15.4	0.0226	0%		6.87		8.31		8.89		9.23	-6.16	OK	NE					
	Section		21	0.013		9.90	439	0.0226	9.92	15.4	0.0226	0%		6.87		8.31		8.89		9.23	-6.16	OK	NE					OK
RE*MILL	R18F-09	R18F-07	30	0.013	126.30	125.00	465	0.0028	4.43	14.0	0.0024	22% mill-x	2.55	9.43	2.94	11.25	3.14	12.03	3.24	12.47	-1.56	OK	NE	1.02	1.30	0.28	-0.06	
RE*MILL	R18F-07	R18F-06	30	0.013	125.00	124.40	424	0.0014	3.15	10.0	0.0024	0%		9.43		11.25		12.03		12.47	2.49	18	2020	0.93	0.60	-0.33	-0.33	ignore
												-100% MILL #6	-9.43		-11.25		-12.03		-12.47				X					
RE*MILL	R18F-06	R18F-05	30	0.013	124.40	123.40	483	0.0021	3.81	12.1	0.0024	25% mill-x	2.90	2.90	3.34	3.34	3.57	3.57	3.68	3.68	-8.39	OK	NE					
RE*MILL	R18F-05	R18F-04	30	0.013	123.40	122.00	547	0.0026	4.24	13.4	0.0024	0%		2.90		3.34		3.57		3.68	-9.74	OK	NE					
RE*MILL	R18F-04	R18F-03	30	0.013	122.00	120.60	540	0.0026	4.27	13.5	0.0024	0%		2.90		3.34		3.57		3.68	-9.83	OK	NE					
RE*MILL	R18F-03	R18F-02C	30	0.013	120.60	120.40	93	0.0022	3.88	12.3	0.0024	0%		2.90		3.34		3.57		3.68	-8.62	OK	NE					
RE*MILL	R18F-02C	R18F-02B	30	0.013	120.40	119.30	515	0.0021	3.87	12.3	0.0024	0%		2.90		3.34		3.57		3.68	-8.58	OK	NE					
RE*MILL	R18F-02B	R18F-02A	30	0.013	119.30	118.80	182	0.0027	4.39	13.9	0.0024	0%		2.90		3.34		3.57		3.68	-10.23	OK	NE					
RE*MILL	R18F-02A	R18F-02	30	0.013	118.80	118.70	67	0.0015	3.24	10.3	0.0024	0%		2.90		3.34		3.57		3.68	-6.57	OK	NE					
RE*MILL	R18F-02	R18F-01	30	0.013	118.70	117.50	375	0.0032	4.74	15.0	0.0024	0%		2.90		3.34		3.57		3.68	-11.33	OK	NE	0.07	1.20	1.13	1.02	
	Section		30	0.013		8.80	3691	0.0024	4.09	13.0	0.0024	0%		2.90		3.34		3.57		3.68	-9.27	OK	NE					OK

Task 240 Report:
KENT PLANNING ZONE - REROUTING ALTERNATIVE

FACILITY	UP-STREAM MH #	DOWN-STREAM MH #	DIA. (IN)	Manning n	UP-STREAM INV ELEV	DOWN-STREAM INV ELEV	LENGTH (FT.)	SLOPE (FT/FT)	Vfull (FPS)	Cap. (MGD)	Herrera: New Slope	Modification: Origin of Flow Percent	2010 Design Flow: Inflow (MGD)	2010 Design Flow: Total (MGD)	2020 Design Flow: Inflow (MGD)	2020 Design Flow: Total (MGD)	2030 Design Flow: Inflow (MGD)	2030 Design Flow: Total (MGD)	2050 Design Flow: Inflow (MGD)	2050 Design Flow: Total (MGD)	Excess (+) (MGD)	2050 Parallel Pipe (in.)	Decade Exceeded	Surcharge: any negative value in "BW elev": Δ elev FULL pipe	Δ elev	Δ−Δfull	BW (ft)	Proposed Diameter (inches)
RE*ULID1/5	R18F-01	75	30	0.013	117.50	117.60	43	-0.0023			0.0015	0%		2.90		3.34		3.57		3.68	3.68	21	2010	0.01	-0.10	-0.11	-0.11	ignore
RE*ULID1/5	75	74AA	30	0.013	117.60	117.50	11	0.0091	7.99	25.3	0.0015	0%		2.90		3.34		3.57		3.68	-21.61	OK	NE					
RE*ULID1/5	74AA	74	30	0.013	117.50	117.40	109	0.0009	2.54	8.0	0.0015	0%		2.90		3.34		3.57		3.68	-4.36	OK	NE					
RE*ULID1/5	74	73	30	0.013	117.40	116.80	348	0.0017	3.48	11.0	0.0015	0%		2.90		3.34		3.57		3.68	-7.34	OK	NE					
RE*ULID1/5	73	72	30	0.013	116.80	116.10	400	0.0018	3.50	11.1	0.0015	0%		2.90		3.34		3.57		3.68	-7.41	OK	NE					
RE*ULID1/5	72	71	30	0.013	116.10	115.60	315	0.0016	3.34	10.6	0.0015	0%		2.90		3.34		3.57		3.68	-6.89	OK	NE					
RE*ULID1/5	71	70	30	0.013	115.60	115.20	270	0.0015	3.22	10.2	0.0015	0%		2.90		3.34		3.57		3.68	-6.53	OK	NE					
RE*ULID1/5	70	69	30	0.013	115.20	114.40	494	0.0016	3.37	10.7	0.0015	0%		2.90		3.34		3.57		3.68	-6.99	OK	NE					
RE*ULID1/5	69	68	30	0.013	114.40	113.70	485	0.0014	3.18	10.1	0.0015	0%		2.90		3.34		3.57		3.68	-6.39	OK	NE					
RE*ULID1/5 @SR167	68	67	30	0.013	113.70	113.50	123	0.0016	3.38	10.7	0.0015	0%		2.90		3.34		3.57		3.68	-7.01	OK	NE					
Section			30	0.013		4.00	2598	0.0015	3.29	10.4	0.0015	0%		2.90		3.34		3.57		3.68	-6.73	OK	NE					OK
RE*ULID1/5	67	66	27	0.013	113.50	113.00	296	0.0017	3.21	8.2	0.0016	0%		2.90		3.34		3.57		3.68	-4.55	OK	NE					
RE*ULID1/5	66	65	27	0.013	113.00	112.40	412	0.0015	2.98	7.6	0.0016	0% xval-x		2.90		3.34		3.57		3.68	-3.96	OK	NE					
RE*ULID1/5	65	64	27	0.013	112.40	111.70	467	0.0015	3.02	7.8	0.0016	0%		2.90		3.34		3.57		3.68	-4.07	OK	NE					
RE*ULID1/5	64	63	27	0.013	111.70	111.20	258	0.0019	3.44	8.8	0.0016	0%		2.90		3.34		3.57		3.68	-5.14	OK	NE					
RE*ULID1/5	63	62	27	0.013	111.20	110.50	404	0.0017	3.25	8.3	0.0016	8% mill-x	0.93	3.83	1.07	4.41	1.14	4.71	1.18	4.86	-3.48	OK	NE					
RE*ULID1/5	62	61	27	0.013	110.50	110.00	322	0.0016	3.08	7.9	0.0016	0%		3.83		4.41		4.71		4.86	-3.04	OK	NE					
Section			27	0.013		3.50	2159	0.0016	3.14	8.1	0.0016	0%		3.83		4.41		4.71		4.86	-3.20	OK	NE					OK
RE*ULID1/5	61	60	30	0.013	110.00	109.20	469	0.0017	3.46	11.0	0.0013	0%		3.83		4.41		4.71		4.86	-6.10	OK	NE					
RE*ULID1/5	60	59	30	0.013	109.20	108.70	430	0.0012	2.86	9.0	0.0013	0%		3.83		4.41		4.71		4.86	-4.18	OK	NE					
RE*ULID1/5	59	58	30	0.013	108.70	108.10	504	0.0012	2.89	9.2	0.0013	0%		3.83		4.41		4.71		4.86	-4.29	OK	NE					
RE*ULID1/5	58	57	30	0.013	108.10	107.60	419	0.0012	2.89	9.2	0.0013	0%		3.83		4.41		4.71		4.86	-4.31	OK	NE					
Section			30	0.013		2.40	1822	0.0013	3.04	9.6	0.0013	0%		3.83		4.41		4.71		4.86	-4.77	OK	NE					OK
RE*ULID1/5	57	R18-30	42	0.013	106.60	106.40	404	0.0005	2.33	14.5	0.0004	100% ULID1/5 57A	8.18	12.01	9.74	14.15	10.36	15.07	10.64	15.50	1.02	18	2030	0.23	0.20	-0.03	-0.24	ignore
RE*ULID1/5	56	55	42	0.013	106.40	106.30	393	0.0003	1.67	10.4	0.0004	0%		12.01		14.15		15.07		15.50	5.12	30	2010	0.22	0.10	-0.12	-0.22	ignore
RE*ULID1/5	55	54	42	0.013	106.30	106.10	432	0.0005	2.26	14.0	0.0004	0%		12.01		14.15		15.07		15.50	1.49	21	2020	0.24	0.20	-0.04	-0.09	ignore
RE*ULID1/5	54	53	42	0.013	106.10	105.90	442	0.0005	2.23	13.8	0.0004	0%		12.01		14.15		15.07		15.50	1.65	21	2020	0.25	0.20	-0.05	-0.05	ignore
Section			42	0.013		0.70	1671	0.0004	2.15	13.3	0.0004	0%		12.01		14.15		15.07		15.50	2.18	24	2020					ignore
RE*ULID1/5	53	52	42	0.013	105.90	103.70	436	0.0050	7.45	46.2	0.0050	0%		12.01		14.15		15.07		15.50	-30.73	OK	NE					
Section			42	0.013		2.20	436	0.0050	7.45	46.2	0.0050	0%		12.01		14.15		15.07		15.50	-30.73	OK	NE					OK
RE*ULID1/2	52	51	72	0.012	103.70	103.60	353	0.0003	2.74	50.0	0.0003	100% KXVAL	23.06	35.07	30.13	44.28	32.06	47.12	32.78	48.28	-1.67	OK	NE					
																			174.85	174.85	CHECK							
*RWSP pipe or section data revised.																												

KENT PLANNING ZONE
TASK 240 REROUTING ALTERNATIVE

APPENDIX 240-I

SOOS PLANNING ZONE ALTERNATIVES

Soos Planning Zone Alternatives
7% I/I Degradation per Decade

Retional Facility	Flowrate (mgd)	Total Head TDH (ft)	Upstream Elevation (ft)	Downstream or High Point Elevation (ft)	Downstream Invert Elevation (ft)	Static Head (ft)	Forcemain Diameter (inches)	Forcemain Length (ft)	HDR $ ($/LF)	Forcemain headloss w/ C=140 (ft)	Forcemain Velocity (fps)	Gravity Main Diameter (inches)	Gravity Main Length (ft)	calc'd slope	design slope	HDR $ ($/LF)	Preliminary Estimated Conveyance Cost
ALTERNATIVE 1			Criteria: TDH >200 ft & 8 fps velocity							140					0.013		
PS B	3.2	197	300	460	370		15			37.5	3.99						$2,500,000
Fm B		175				160	18	11,600	$418	15.4	2.77						$4,848,800
Gravity B		164					24			3.8	1.56	15	6,900	0.0130	0.0130	$398	$2,746,200
																	$10,095,000
PS C	30.8	197	360	490	410		24			67.5	9.85						$8,000,000
Fm C-parallel	20.0	168				130	27	6,800	$510	38.0	7.78						$3,468,000
Gravity C		153					30			22.8	6.30	27	6,500	0.0123	0.0120	$510	$3,315,000
	10.8	PS C - revised criteria to use 27" FM															$14,783,000
PS D																	
Fm D																	
Gravity D																	
PS E	8.6	216	380	490	410		15			105.9	6.07						$2,500,000
Fm E-parallel	4.8	154				110	18	15,100	$418	43.6	4.22						$6,311,800
Gravity E-parallel		131					21			20.6	3.10						
	3.7																$8,811,800
PS F	12.3	353	390	470	360		15			322.7	8.21						$3,000,000
Fm F-parallel	6.5	163				30	18	26,300	$418	132.9	5.70						$10,993,400
Gravity F-parallel		93		(Low Pt @ 340)			21			62.8	4.19						
	5.8																$13,993,400
PS G: no change																	
PS H	5.3	207	533	581	357		10			30.5	10.41						$2,000,000
Fm H	3.7	189				176	12	1,000	$363	12.6	7.23						$363,000
Gravity G-parallel		180					15			4.2	4.63	21	32,758	0.0068	0.00155	$439	$14,380,762
	1.6																$16,743,762
		5 pump stations		new pump stations:		5		60,800					46,158			ALTERNATIVE 1	**$64,430,000**
ALTERNATIVE 2			Criteria: TDH >200 ft & 8 fps velocity									**ALTERNATIVE 2**					
PS B	28.9	208	300	460	370		33			48.3	7.53						$12,500,000
Fm B		192				160	36	11,600	$645	31.7	6.33						$7,482,000
Gravity B		175					42			15.0	4.65	30	6,900	0.0130	0.0130	$561	$3,870,900
																	$23,852,900
PS C	5.1	285	360	490	410		12			154.6	9.96						
Fm C		182				130	15	6,800	$398	52.2	6.37						$2,706,400
Gravity C		152					18			21.5	4.43	18	6,500	0.0123	0.0120	$418	$2,717,000
																	$5,423,400
												USE EXISTING LS #10 & PIPES					-$5,423,400
PS D	25.7	128	360	450	300		27			38.4	10.01						$10,500,000
Fm D		113				90	30	4,300	$561	23.0	8.11						$2,412,300
Gravity D		99					36			9.5	5.63	27	6,300	0.0238	0.0230	$510	$3,213,000
																	$16,125,300
PT E	17.5		367	325													
Fm E																	
Gravity E												42	10,000	0.0325	0.00075	$735	$7,350,000
														change due to topography			$7,350,000
PS F	12.3	353	390	470	360		12			272.6	12.83		-				$3,000,000
Fm F-parallel	6.5	172				80	15	7,500	$398	92.0	8.21						$2,985,000
Gravity F		118					18			37.9	5.70	27	11,000	0.0100	0.0052	$510	$5,610,000
	5.8													change due to topography			$11,595,000
PS G: no change																	
PS H	5.3	206	533	581	357		10			29.9	10.30		-				$2,000,000
Fm H	3.6	188				176	12	1,000	$363	12.3	7.15						$363,000
Gravity H-parallel		180					15			4.2	4.58	21	32,758	0.0068	0.00155	$439	$14,380,762
	1.64																$16,743,762
		5 pump stations		new pump stations:		4		31,200					73,458			ALTERNATIVE 2	**$75,670,000**

Basins and 2050 flow (mgd) routed through each pump station

aub3-ne	2.43	sss-x	2.38	sss-x	0.42			ls-11n	3.29	lks-x	2.70	ls-11s	5.27
		mill-q	0.32	scrk-x	7.78					ls-15	9.57		
		ssm-q	0.47	ls-14	0.94								
				sss-ne	0.16								
				jenk-r	0.66								
PS C	30.8			PT E	8.6								
PS B	3.2			PS F	12.28			PS H	5.27				
PT A	36.4	**PS B**	3.2	**PS C**	30.8	**PS D**		**PT E**	8.6	**PS F**	12.3	**PS H**	5.3
mill-e	3.78	through Mill Creek Interceptor											
sss-sw	1.48	through Auburn											

ALTERNATIVE 2

aub3-ne	2.43	sss-x	2.38	scrk-x	5.06	sss-x	0.42			lks-x	2.70	ls-11s	5.27
		ssm-q	0.47			scrk-x	2.72			ls-15	9.57		
		mill-q	0.32			ls-14	0.94						
						sss-ne	0.16						
						jenk-r	0.66						
						ls-11n	3.29						
PS B	28.9							PS H	5.3				
PS C	5.1	PS D	25.74			PT E	17.55	PS F	12.28				
PT A	36.4	**PS B**	28.9	**PS C**	5.1	**PS D**	25.7	**PT E**	17.5	**PS F**	12.3	**PS H**	5.3
mill-e	3.78	through Mill Creek Interceptor											
sss-sw	1.48	through Auburn											

Soos Planning Zone Alternatives
7% I/I Degradation per Decade

Retional Facility	Flowrate (mgd)	Total Head TDH (ft)	Upstream Elevation (ft)	Downstream or High Point Elevation (ft)	Downstream Invert Elevation (ft)	Static Head (ft)	Forcemain Diameter (inches)	Forcemain Length (ft)	HDR $ ($/LF)	Forcemain headloss w/ C=140 (ft)	Forcemain Velocity (fps)	Gravity Main Diameter (inches)	Gravity Main Length (ft)	calc'd slope	design slope	HDR $ ($/LF)	Preliminary Estimated Conveyance Cost
ALTERNATIVE 3			Criteria: TDH >200 ft & 8 fps velocity									**ALTERNATIVE 3**					
PS B	3.2	210	300	450	360		12			60.2	6.24						$2,500,000
Fm B		170				150	15	6,300	$398	20.3	3.99						$2,507,400
Gravity B		158					18			8.4	2.77	12	4,300	0.0209	0.0200	$363	$1,560,900
																	$6,568,300
PS C	5.1	285	360	490	410		12			154.6	9.96						
Fm C		182				130	15	6,800	$398	52.2	6.37						$2,706,400
Gravity C		152					18			21.5	4.43	18	6,500	0.0123	0.0120	$418	$2,717,000
																	$5,423,400
													USE EXISTING LS #10 & PIPES				-$5,423,400
PS D	28.9	199	360	480	360		33			79.2	7.53						$12,000,000
Fm D		172				120	36	19,000	$645	51.8	6.33						$12,255,000
Gravity D		144					42			24.5	4.65	30	6,700	0.0179	0.0170	$561	$3,758,700
																	$28,013,700
PT E	17.5		367	325													
Fm E																	
Gravity E												42	10,000	0.0325	0.00075	$735	$7,350,000
													change due to topography				$7,350,000
PS F	12.3	353	390	470	360		12			272.6	12.83		-				$3,000,000
Fm F-parallel	6.5	172				80	15	7,500	$398	92.0	8.21						$2,985,000
Gravity F		118					18			37.9	5.70	27	11,000	0.0100	0.0052	$510	$5,610,000
PS F	5.8												change due to topography				$11,595,000
PS G: no change																	
PS G																	
PS H	5.3	207	533	581	357		10			30.5	10.41		-				$2,000,000
Fm H	3.7	189				176	12	1,000	$363	12.6	7.23						$363,000
Gravity H-parallel		180					15			4.2	4.63	21	32,758	0.0068	0.00155	$439	$14,380,762
PS H	1.6																$16,743,762
			5 pump stations		new pump stations:	4		40,600					71,258		ALTERNATIVE 3		**$70,270,000**
ALTERNATIVE 4			Criteria: TDH >200 ft & 8 fps velocity														
PS B	3.2	197	300	460	370		15			37.5	3.99						$2,500,000
Fm B		175				160	18	11,600	$418	15.4	2.77						$4,848,800
Gravity B		167					21			7.3	2.04	15	6,900	0.0130	0.0130	$398	$2,746,200
																	$10,095,000
PS C	5.1	285	360	490	410		12			154.6	9.96						
Fm C		182				130	15	6,800	$398	52.2	6.37						$2,706,400
Gravity C		152					18			21.5	4.43	18	6,500	0.0123	0.0120	$418	$2,717,000
																	$5,423,400
													USE EXISTING LS #10 & PIPES				-$5,423,400
PS D	25.7	222	360	480	360		30			101.6	8.11						$10,500,000
Fm D		184				120	33	19,000	$645	63.9	6.70						$12,255,000
Gravity D		162					36			41.8	5.63	27	6,700	0.0179	0.0170	$510	$3,417,000
																	$26,172,000
PT E	17.5		367	325													
Fm E																	
Gravity E												42	10,000	0.0325	0.00075	$735	$7,350,000
													change due to topography				$7,350,000
PS F	12.3	353	390	470	360		12			272.6	12.83						$3,000,000
Fm F-parallel	6.5	172				80	15	7,500	$398	92.0	8.21						$2,985,000
Gravity F		118					18			37.9	5.70	27	11,000	0.0100	0.0052	$510	$5,610,000
PS F	5.8												change due to topography				$11,595,000
PS G: no change																	
PS G																	
PS H	5.3	207	533	581	357		10			30.5	10.41		-				$2,000,000
Fm H	3.7	189				176	12	1,000	$363	12.6	7.23						$363,000
Gravity H-parallel		180					15			4.2	4.63	21	32,758	0.0068	0.00155	$439	$14,380,762
PS H	1.6																$16,743,762
			5 pump stations		new pump stations:	4		45,900					73,858		ALTERNATIVE 4		**$71,960,000**

Basins and 2050 flow (mgd) routed through each pump station

ALTERNATIVE 3

aub3-ne	2.43	sss-x	2.38	scrk-x	5.06	sss-x	0.42			lks-x	2.70	ls-11s	5.27
		ssm-q	0.47			scrk-x	2.72			ls-15	9.57		
		mill-q	0.32			ls-14	0.94						
						sss-ne	0.16						
						jenk-r	0.66						
						ls-11n	3.29						
PS C	5.1					PS B	3.17	PS H	5.3				
PS D	28.90					PT E	17.55	PS F	12.28				
PT A	36.4	**PS B**	3.2	**PS C**	5.1	**PS D**	28.9	**PT E**	17.5	**PS F**	12.3	**PS H**	5.3
mill-e	3.78	through Mill Creek Interceptor											
sss-sw	1.48	through Auburn											

ALTERNATIVE 4

aub3-ne	2.43	sss-x	2.38	scrk-x	5.06	sss-x	0.42			lks-x	2.70	ls-11s	5.27
		ssm-q	0.47			scrk-x	2.72			ls-15	9.57		
		mill-q	0.32			ls-14	0.94						
						sss-ne	0.16						
						jenk-r	0.66						
						ls-11n	3.29						
PS C	5.1												
PS B	3.2							PS H	5.3				
PS D	25.74					PT E	17.55	PS F	12.28				
PT A	36.4	**PS B**	3.2	**PS C**	5.1	**PS D**	25.7	**PT E**	17.5	**PS F**	12.3	**PS H**	5.3
mill-e	3.78	through Mill Creek Interceptor											
sss-sw	1.48	through Auburn											